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ACORN USER

FEBRUARY 1987

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BBC COMPACT:
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REVIEWS:
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NIDD VALLEY MICRO PRODUCTS LTD
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ACORN USER

ISSUE No 55 FEBRUARY 1987

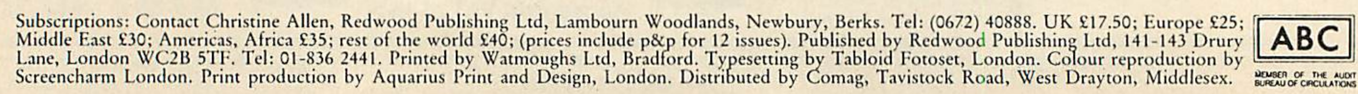
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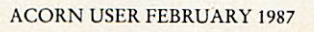
FEATURES

COVER

Illustration by Phil Dobson

NEXT MONTH

Artificial intelligence special issue
David Johnson-Davies is the guest editor



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0415B	Epson JX80 Ribbon	16.22	15.40
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0406D	11" *9.5" Paper 2000	14.03	13.33
0453G	2-part NCR Paper	23.00	21.85
0407C	3.5" *17/16" Labels	5.63	5.35
0416B	Dust Cover KP810	5.45	5.18

WATFORD HARDWARE

Code	Description	Price	Mem Price
0213B	Watford DFS Rom+Man	27.48	26.11
0214B	Watford DDFS Kit	56.35	53.53
0216B	Watford DFS Manual	6.95	6.60
0219B	Watford 1.43 DFS Kit	62.10	59.00
0702B	Watford 32K RAM Card	67.28	63.91
0709D	Watford Eprom Eraser	33.35	31.68
0717B	Watford Sideways ZIF	17.83	16.93
0736B	Watford 12 Rom Board	36.80	34.96
0737B	Watford Battery	4.37	4.15
0751B	Watford 16K Module	32.20	30.59
0752B	Watford Diagnostic	23.00	21.85
0753B	Rom/Ram Board 64K	67.85	64.46
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1101B	WW + Progbook & Disc	20.53	19.50
1102B	Wordwise	28.75	27.31
1103B	C.C. Graphics ROM	24.73	23.49
1104B	Printmaster (Epson)	28.00	26.60
1105B	Printmaster (Star)	28.00	26.60
1107B	Speech ROM	28.00	26.60
1110B	Intersheet	44.85	42.61

1111B	Hi Intersheet Disc	5.75	5.46
1112B	Hi Wordwise + Disc	5.75	5.46
1113B	Caretaker Rom	28.75	27.31
1114B	Interchart	29.90	28.41
1115B	Speech System TTS	30.99	29.44
1117B	Interword	50.03	47.52

OTHER HARDWARE

Code	Description	Price	Mem Price
0701B	Aries B32 RAM Card	93.15	88.49
0704B	ATPL ROM Board BBC	39.67	37.69
0735B	ATPL Battery Backup	17.37	16.50
0740B	Aries B12 Rom Board	46.00	43.70
0749B	Aries B12C Adaptor	5.87	5.57
0705B	2764 8K Eprom	2.64	2.51
0706B	27128 16K Eprom	3.33	3.17
0707B	6264 8K Ram	3.68	3.50
0708B	Eprom Extractor Tool	3.45	3.28
0710B	Spotlife Rom Blower	75.90	72.11
0714B	BBkey Labels	2.09	1.99
0715B	Dust Cover BBC B/B+	3.45	3.28
0734B	Dust Cover Master	4.60	4.37
0718B	Voltmace 3B Single	9.99	9.49
0719B	Voltmace 3B Twin	17.00	16.15
0720B	Voltmace Delta 14B	12.50	11.88
0721B	Voltmace Delta 14B/1	13.00	12.35
0762E	Beebug Magic Modem	90.00	85.50
0763E	Beebug Modem + S'ware	104.00	98.80
0810D	BBC Keyboard	52.90	50.26
0811B	Video ULA Chip	17.25	16.39
0812B	A to D D7002C Chip	5.29	5.03
0814B	Keyboard Connector	5.75	5.46
0815B	65C02 CPU	13.80	13.11
0764F	Red Box Starter System	129.00	122.55
0765D	Red Leader	59.95	56.95
0766D	Red One	34.95	33.20
0767D	Red Two	34.95	33.20
0809D	Master Keyboard	52.90	50.26

ACORNSOFT

Code	Description	Price	Mem Price
1022C	View 3.0 Rom	66.70	63.36
1002B	Acornsoft Hi-View	44.28	42.06
1014B	View Print/Drive Disc	9.77	9.29
1043B	Acorn Viewspell Rom	34.02	32.32
1021B	Acorn Viewindex Disc	14.37	13.66
1019B	Acorns Viewstore Rom	44.28	42.06
1030B	Acornsoft ViewPlot	25.30	24.03
1001B	Acornsoft View Sheet	44.28	42.06
0243B	Master Lisp C.ROM	59.69	56.70
1041B	Acornsoft Forth Rom	38.53	36.60
1027C	Micro PROLOG	74.75	71.01
1033B	Microtext Disc	55.20	52.44
1034C	Microtext Plus Rom	240.00	228.00
1035B	6502 Dev. Pack	45.00	42.75
1004B	Acornsoft BCPL	50.03	47.52
1026B	BCPL Generator	43.57	41.39
1005B	Acornsoft Comal	41.97	39.88
1006B	Acornsoft Logo	50.71	48.18
1007C	Acornsoft ISO Pascal	50.71	48.18
1028B	Pascal Generator	32.78	31.14
1008B	Acornsoft Basic Ed	28.00	26.60
1040C	Micros Business Disc	47.27	44.90
1017B	Acornsoft GXR B	25.43	24.16
1018B	Acornsoft BXR B+	25.43	24.16
1039B	Creative Sound Disc	19.00	18.05
1015B	Acornsoft Revs Disc	17.08	16.22
1029B	Revs 4 Tracks Disc	11.95	11.35
1016B	Acorn Aviator Disc	17.08	16.22
1036B	Elite Disc All'vers	14.95	14.20

AMX MOUSE

Code	Description	Price	Mem Price
0703B	AMX Mouse	72.63	69.00
1150B	AMX Desk Disc	19.00	18.05
1151B	AMX 3D Zicon Disc	19.00	18.05

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By DFS we mean an ACORN DFS or Watford single density DFS

Computers must obviously be in good working condition to qualify for this offer. If you wish to take advantage of this service please write to us or telephone. Do not just send your machine, as we are only able to accept orders subject to availability.

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News

Next month in AU

March sees the start of several special isues of *Acorn User*. The first puts David Johnson-Davies, former managing director of Acornsoft, in the Guest Editor's chair with articles devoted to artificial intelligence.

These will give a flavour of what all the talk of 'Fifth Generation' computing is about, and be a boon to those with an interest in programming techniques and languages.

Other features on the way for March include Joe Telford who devotes his Jottings column to trivial pursuiting.

Martin Phillips puts databases in the spotlight in Hints and Tips with a guide to what they are and what they can do for you. He also tackles the thorny subject of *View* printer drivers for the Compact and Master computers.

April has the theme of music. This will include a music generating program and details of a standard file arrangement.

Readers may notice that some of the regulars are missing from this month's issue. Everything will back to normal next month!

Assistant Editor

Experienced journalist is urgently required to work on *Acorn User* and *School Computer User*. Reporting experience vital, computing knowledge a bonus. Must be well-organised, self-motivating and willing to help out in small editorial team producing two of Britain's best computing magazines. Competitive salary for the right person.

Write with career details to: The Editor, *Acorn User*, 141-143 Drury Lane, London WC2B 5TF. Deadline is January 20, 1987.

Domesday debut: more discs soon

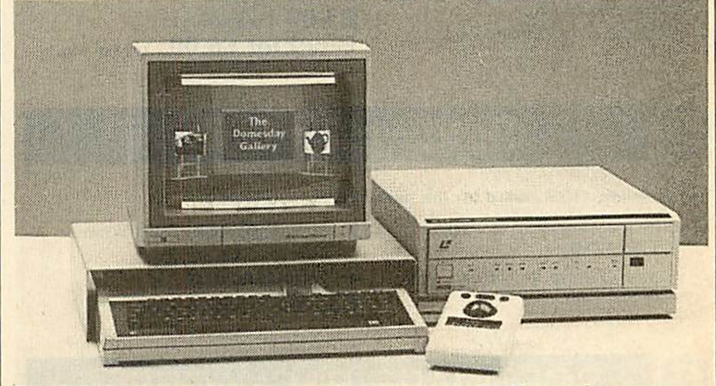
The BBC's electronic version of the 1086 Domesday Book is now on sale. It comes on two Phillips interactive video discs controlled by a BBC Master Turbo — a lot of it thanks to a million schoolchildren who helped gather the data, many using BBC micros.

The next stage will be the release of further discs.

The user can move across maps of Britain and pick out pictures and information about even the smallest villages.

Two video discs contain 24,000 maps, 150,000 pages of teletext information, more than 20,000 photographs, the 1981 census and the parliamentary record Hansard. The statistics, using the special chip based software, can be overlaid on the video images.

One section of the discs has 'exhibitions' showing art and everyday objects. A further part contains 'walks'.



The £4000 system: Master, monitor, trackerball, discs, player

Access to all the maps, pictures and information is through a pointer on the screen which is moved about by a trackerball controller. Also, the massive database on the discs can be searched by keyword.

The complete system costs £3995, although an upgrade is available for the Master 128, but not the BBC B. Schools can obtain a £1000 subsidy.

More video discs are on the way for the system. The Open University has two, one on stress, the other on engineering materials. The BBC has the Ecodisc, a simulation of running a nature reserve. Other titles are being prepared for schools at seven centres around the country.

Hotline for hapless

Laskys, the High Street retailer, has announced a hotline service to help new computer owners having difficulty with their hardware or software.

The service is the result of a deal between Laskys and the software group Interlex. Laskys sees the hotline as a means of encouraging potential customers, giving them the confidence to make a purchase and to select the right product.

The subscription fee will be £39.99 for three months and will offer a six-day service, 9am to 9pm weekdays and 9am to 1pm Saturdays, covering all the hardware and software options available from the 53 Laskys stores around Britain.

Laskys said, 'We now provide cover for the great majority of problems that beset new microcomputer owners.' Users with a modem will be able to contact Interlex on-line and receive the same step-by-step advice.

Details can be obtained from Chris Townsend, Marketing Controller, Laskys, Hardman House, The Hyde, Hendon, London NW9 6JJ.

Master upgrades on your model B

An interface to connect a BBC micro to Master co-processor boards has been developed by Watford Electronics.

The Co-pro Adapter allows both the 512 and Turbo boards to be connected. The £230 512 board runs some IBM software through the MS-DOS and Gem operating software. The Turbo adds a 6502 chip with 64k of memory in a similar way to the 6502 second processor.

The Co-pro costs £57.50 and works with the BBC model B and B+.

News in Brief

Chalice softwarehas a new version of the *MegaROM* utility ROM chip which will work with the BBC Master and Compact. The chip carries a toolkit and a number of utilities, including a disassembler and memory editor.

Among other features are a formatter and ADFS utilities. It costs £29.95 from Chalice Software, 3 Merlin Way, Covington, Swindon, Wilts.

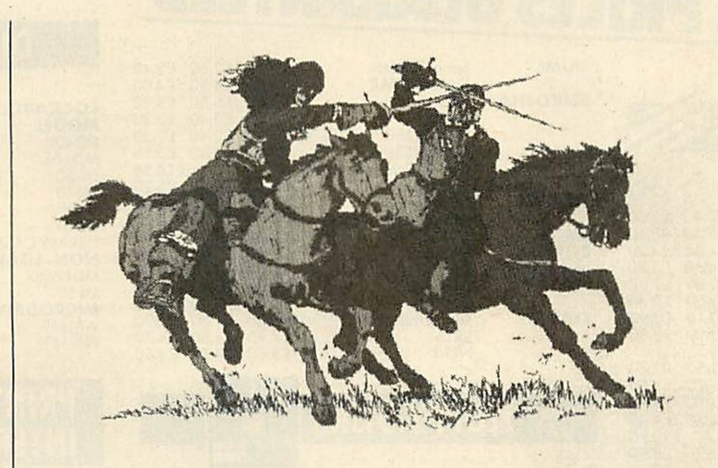
A bulletin board offering downloadable software and a user group has been started by Craig Evenson of Bradford, West Yorkshire. The board is called EBBS£1 and runs 24 hours a day on (0274) 41156 at 300/3000 and 1200/75 Baud.

Charterhouse Development Capital have acquired a 10 per cent stake in the successful modem-maker Miracle Technology. Miracle's WS3000 won the title 'Peripheral of the Year' in the 1986 British Microcomputing Awards.

A version of the CRL adventure game *Cyborg* has been released for the BBC micro. *Cyborg* is centred on the half-man, half-machine Cyborg character. It costs £8.95.

Canadian Instrument and Electronics has released the £215 QB512 Printer Buffer, (with 64k of RAM). Chips can be added to take this to 512k. CIE has also released a £70 converter taking serial data from a computer and feeding parallel data to a printer.

Canadian Instruments and Electronics, Harris-Bass House, Station Road, Ilkeston, Derbyshire DE7 5TX.



High definition Mitsubishi hot wax colour printout

Scouts shout about micros

Scouts from the Leighton Buzzard district used a BBC micro with *Commstar* software and a Nightingale modem to exchange messages with other Scouts as far away as Northern Ireland in the course of work for their Communicators Proficiency Badge.

Brett Dillon, Christopher Carline, Mathew Blades, Dean Palmer, Lincoln Allsop and Gavin Fogg, all of the Heath and Reach Troop, went a step further at the conclusion of the 1986 Jamboree-on-the-air in using Prestel to exchange badges with other Scouts.

'Swapping Distict badges is an activity almost as old as Scouting itself,' commented District Commissioner Dick Johnson, 'but negotiating by electronic mail brings it a new dimension. It also demonstrates how the new Scout training programme can be speedily adapted to reflect technical change.'

Scouts can also test for a Computing Badge by demonstrating competence in designing small programs and the use of computers.

Older Scouts taking the Chief Scout's Challenge – an arduous undertaking involving a high degree of physical activity combined with an educational pursuit – have made extensive use of computers in preparing text and graphics for their final reports.

Scouts are aided in their use of computers by Leaders, most of whom use computers in their work – the equipment for the electronic mail badge swap belonged to British Rail and was lent by BR Chief Publicity officer John Fogg, whose son participated in the event.

Now you can be your own Brian, Brian

A game with a difference will be available from CDS Software in mid-January this year.

Brian clough's Football Fortunes is a combination computer and board game in which two to five players act as team managers, the remainder of the 10-strong league being managed by the computer.

The game was written with advice from the Man 'Imself and involves all the traditional methods by which football is 'managed'. The game pack consists of a program cassette or disc, game board and five counters, player cards, immunity cards – and stacks of money.

The cassette version is priced at £14.95 and the disc is £17.95.

Images frozen for new uses

Two companies are offering reproduction services for computer graphics.

iO Research, distributor of Mitsubishi hot wax technology thermal printers (£3999 plus VAT) and Canon laser printers (£3845 plus VAT), offers a quality print-out of colour or monochrome graphics from disc at a one-off cost of £4 per print or £5 per acetate.

Flintdown Video will provide a full-colour 'video dump' from disc onto a wide variety of video formats, using high-speed analogue to digital conversion and a digital frame store to generate full frame, high definition video pictures. Each frame from the disc can be held as long as required and a soundtrack can be added.

Flintdown sees its service as of particular use to publishers of computer-generated educational programs.

Full details are available from: iO Research, 4 Exchange Buildings, High Street, Barnet, Herts EN5 5SY; Flintdown, Montauban Chambers, 339 Clifton Drive South, Lytham St Annes FY8 1LP

3 Belgian Beeb user groups

A letter from a reader in Belgium includes details of these three Belgian User Groups.

Acorn Computer Club Antwerp, c/o Coddenstraat 19, B-2018 Antwerpen; phone (03) 235 1380. Meets on the first and third Tuesday of each month at 8pm.

Bruxelles Acorn Club, c/o Bvd. du Prince Leopold 122, B-1070 Bruxelles.

Acorn Computer User Club, Boite postale 325, B-1000 Bruxelles. Meets on alternate Wednesdays at Videosoft, Chee de Boondael 418, B-1050 Bruxelles; phone (02) 647 2940.

Computers by Post

LOWEST U.K. PRICES GUARANTEED



PRINTER RIBBONS

		2+	5+	12+
ACORN	AP80	£2.95	£2.40	£2.30
	AP100	£2.95	£2.40	£2.30
AMSTRAD	DMP1	£3.90	£3.30	£3.10
	DMP2000/3000	£4.60	£4.30	£4.20
	PCW8256/8512	£5.20	£4.60	£4.50
BROTHER	HR5	£3.00	£2.80	£2.60
	HR15 Corr	£2.90	£2.50	£2.30
	HR15 FAB	£3.60	£3.10	£2.90
	HR15 MS	£3.50	£3.00	£2.80
	HR15 also for HR25/HR35			
	EP44	£2.90	£2.50	£2.30
	M1009	£3.70	£3.20	£3.00
CANON	PW1080A Black	£3.40	£2.90	£2.70
	PW1080A Red or Blue	£5.30	£4.70	£4.40
	PJ1080 Ink Jet Colour. One Off			£10.90
	PJ1080 Ink Jet Black. One Off			£8.90
CBM	1515	£2.95	£2.40	£2.30
	1525	£2.95	£2.40	£2.30
	MPS801	£3.90	£3.30	£3.10
	802/1526	£4.00	£3.20	£3.00
	803	£3.70	£3.20	£3.00
	MPS1000	£3.00	£2.60	£2.40
	4022	£3.00	£2.60	£2.40
	MSC801 Colour. One Off			£18.50
	DPS1101 SS	£1.60	£1.30	£1.20
	DPS1101 MS	£2.50	£2.10	£2.00
	DPS1101 Corr	£1.80	£1.50	£1.40
CENTRONICS	GLP	£3.70	£3.20	£3.00
CITIZEN	120D	£5.00	£4.60	£4.30
DAISYSTEP	2000 MS	£3.10	£2.60	£2.40
	2000 FAB	£4.90	£4.20	£4.00
EPSON	MX/FX/RX80 Black	£3.00	£2.60	£2.40
	MX/FX/RX80 Red or Blue	£4.20	£3.50	£3.30
	100 Series	£5.00	£4.60	£4.30
	LX80/LX86	£3.00	£2.60	£2.40
	JX80 Colour. One Off			£18.50
	LQ800	£3.90	£3.50	£3.30
	LQ1500	£4.50	£3.90	£3.60
JUKI	6000/2200 FAB	£3.70	£3.40	£3.20
	6000/2200 Corr	£4.00	£3.60	£3.40
	6000/2200 SS	£3.10	£2.70	£2.50
	6100 MS	£2.50	£2.10	£2.00
	6100 SS	£1.60	£1.30	£1.20
	6100 Corr	£1.80	£1.50	£1.40
KAGA	KP810 Black	£3.40	£2.90	£2.70
	KP810 Red or Blue	£5.30	£4.70	£4.40
M/TALLY	MT80	£4.00	£3.20	£3.00
OKI	80/82	£1.60	£1.30	£1.20
	84	£3.90	£3.40	£3.20
	Mate 20 Colour	£7.00	£6.50	£6.20
	Mate 20 Black	£6.60	£6.20	£6.00
PANASONIC	KX1091/2	£5.00	£4.60	£4.30
QUENDATA	DWP1120 MS	£3.10	£2.60	£2.40
	DWP1120 FAB	£4.90	£4.20	£4.00
QUME	Sprint 7/9 MS	£3.10	£2.60	£2.40
	Sprint 7/9 FAB	£4.90	£4.20	£4.00
SEIKOSHA	GP50	£6.00	£5.50	£5.20
	GP80	£2.95	£2.40	£2.30
	GP100/250	£2.95	£2.40	£2.30
	GP500/550	£3.90	£3.30	£3.10
	GP700 Colour. One Off			£18.50
	SP1000	£6.00	£5.50	£5.20
SHINWA	CP80	£4.00	£3.20	£3.00
	Fastext 80 (Twinpack)	£11.70	£11.20	£10.90
SMITH CORONA (originals)	TPI M/S	£8.50	£7.90	£7.20
	TPI Fabric	£3.90	£3.60	£3.40
	TPI Corr	£5.00	£4.70	£4.50
	D100/200	£9.00	£8.50	£8.20
	D300	£6.00	£5.50	£5.30
STAR	DP/GEMINI/SG	£1.60	£1.30	£1.20
	SR15	£4.90	£4.50	£4.30
	NL10	£5.60	£4.90	£4.60

FLOPPY DISKS



5¼"		BOXES OF 10 DISKS		
JVC inc Plastic Case		1-2	3-9	10+
MD-1D	S/side D/dens 40TR	£9.99	£9.50	£9.25
MD-2D	D/side D/dens 40TR	£11.99	£11.50	£11.25
MD-2DD	D/side Q/dens 80TR	£15.99	£15.50	£15.25
MD-2HD	D/side H/dens 1.6MB	£26.99	£25.99	£25.49
VERBATIM – DATALIFE				
MD525	S/side D/dens 40TR	£11.99	£11.75	£11.49
MD550	D/side D/dens 40TR	£14.99	£14.75	£14.49
MD577	S/side Q/dens 80TR	£14.99	£14.75	£14.49
MD557	D/side Q/dens 80TR	£19.99	£18.99	£18.50
MD HD	D/side H/dens 1.6MB	£27.99	£26.99	£25.99
FUJI	*S/side D/dens 40TR	£10.99	£10.50	£10.25
	*D/side D/dens 40TR	£13.49	£12.99	£12.75
*Coloured Disks – red, green, blue, beige, grey £1.00 per box extra.				
	D/side D/dens 80TR	£17.99	£17.50	£17.25
3½"		**BOXES OF 10 DISKS**		
JVC/TDK	S/side D/dens	£17.99	£17.25	£16.99
SONY/FUJI	S/side D/dens	£18.99	£18.25	£17.99
FUJI/TDK	D/side D/dens	£26.99	£26.50	£25.99
SONY	D/side D/dens	£27.99	£27.50	£26.99

BULK 3½" D/SIDE D/DENS DISKS BY SONY

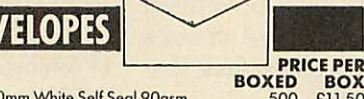
10 x Disks £1.99 each £19.90 pack
20 x Disks £1.89 each £37.80 pack

3" DISKS

CF2 5 Disks £3.25 each £16.25 pack
CF2 10 Disks £2.99 each £29.90 pack

DISK MAILERS 5¼" 95p each (min. 5).

ENVELOPES



	BOXED	PRICE PER BOX
110mm x 220mm White Self Seal 90gsm	500	£11.50
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DISK STORAGE

LOCKABLE DISK BOXES

MODEL	SIZE	CAPACITY	PRICE
DD40L	3"/3.5"	40	£8.90
MD60T	3"/3.5"	60	£12.50
DD50	5¼"	50	£8.90
DD70	5¼"	70	£10.90
DX85	5¼"	90	£12.90
DD100	5¼"	100	£13.90
LIBRARY CASE	5¼"	10	£1.50
NON-LOCKABLE DISK BOXES			
MD12/30	3"/3.5"	24	£7.20
MF50	5¼"	50	£8.00
MICRODRIVE HOLDERS			
WALLET		4	£1.75
WALLET		20	£4.50

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BBC	Parallel	£6.50
IBM	Parallel	£14.50
MSX	Parallel	£10.90
CBM 64/128	Parallel I/F	£59.90
SINCLAIR QL/SPEC 128	Parallel I/F	£26.50
SINCLAIR SPECTRUM	Parallel I/F	£32.50
AMSTRAD PCW	Parallel/Serial I/F	£49.90

COMPUTER STATIONERY

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11 x 9½	60	2000	£12.90	£12.00
11 x 9½	70	2000	£15.90	£14.50
EXACT A4	70	2000	£21.50	£18.75
11⅔ x 9¼	90	1000	£13.50	£11.25

COMPUTER LABELS

Price per thousand in brackets

	1000	2000	4000
70 x 36mm	£5.40	£8.80 (£4.40)	£16.00 (£4.00)
89 x 36mm	£5.50	£9.00 (£4.50)	£16.40 (£4.10)
89 x 49mm 3 across only	£7.20	£12.40 (£6.20)	£22.80 (£5.70)
102 x 36mm	£5.70	£9.40 (£4.70)	£17.60 (£4.40)

Please state number of labels across sheets (1, 2 or 3).

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Epson FX800	£319.95
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Epson LQ800	£454.95
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Seikosha MP1300A	£389.95
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Star NX15	£299.95
Star SD10	£299.95
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Star Powertype Daisywheel	£199.95
Juki 6100	£229.95
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Acorn BBC Master	£399.95
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Amstrad PCW8512	£489.95
Amstrad CPC464 Green	£169.95
Amstrad CPC464 Colour	£254.95
Amstrad CPC6128	£254.95
Amstrad CPC6128 Colour	£339.95
Atari 520STM	£269.95
Atari other models	P.O.A.
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Commodore C64C compend.	£204.95
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CF2 3" Disks Box of 10 **£29.90**	**Maxell 5¼" MD1D** **S/side D/dens 40TR** Box of 10 (min. 2 boxes) **£9.99**	**TDK 5¼"** **S/side D/dens 40TR** Box of 10 (min. 2 boxes) **£8.99**
BASF 5¼" 2D/96 **D/side Q/dens 80TR** Box of 10 (min. 2 boxes) **£11.99**	**SONY 3½"** **D/side D/dens** Box of 10 **£27.99**	**INTERWORD WORD PROCESSOR FOR BBC** **£39.95**

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I wish to order ______

My computer is ______

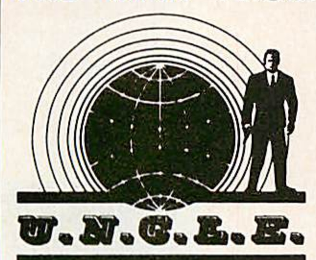
I enclose cheque/PO for £ ______ inc VAT
or charge my Access/Visa No:

Name ______
Signature ______
Address ______

Postcode ______ Tel No: ______

Ac.U. 2/87

THE MAN FROM



Scenario: High Street store. Euthymol Gall in attendance at the computer section. Enter callow youth, laden with greenbacks. Euthymol's dicky-bow spins with delight as he notices the swelling in the young man's breast pocket.

'Good day, young Sir. That's a nasty inflammation of the wallet. How may we ease it for you? A little three-card brag? Pitch-and-toss in the staff rest room? Or would you prefer to drag away one of our cardboard boxes.'

The young chap smiles and speaks. 'Actually I'm after a new computer. One of those 16-bit ones with the cracking Motorola 68000 chip I keep reading about.' Gall's visage darkens. 'Sixteen bit! Heaven forfend, dearest sir. That's too many. All those bits. How can one keep track of them? Think of the maintenance costs. No, light of my life, 8-bits are enough for any man.'

At this point he steers the lad towards the Acorn Corner. Wringing his hands he nods respectfully towards a New Machine. 'Behold. The answer to all your prayers. The Baby Beeb, sprung from the loins of the Master. Eminently suitable for a young gentleman wishing to make a careful purchase. The latest compact micro with free disc drive and monitor.' The boy frowns. 'Compact? What does that mean?'

'Ah, well, all those things you never use, like industry standard interfaces and provision for expansion have been removed to make life easier for me – I mean you. Rather like the Amstrad, except better of course. At 600 sponduliks it's a snip. All your friends will envy you. Come back, sir. Let me just look at the money. I won't touch it, honest.'

'Community TV' uses BBC for noticeboard

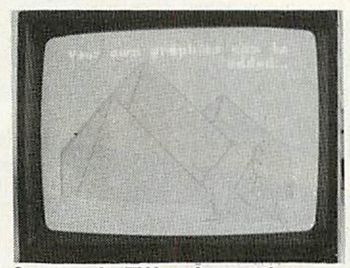
One of Britain's newest cable television companies has chosen BBC micros to produce graphics and title pages.

Cabletel, which covers the Ealing area in London, said the choice of the BBC micro opens the door to a new era in communications. It allows members of the community to contribute directly to television programming with data and graphic input prepared on the writer's own computer and supplied to CableTel on disc.

Local students will contribute designer graphics, and the Ealing Gazette newspaper group will be supplying of local news.

'Many other groups and individuals in the community will have access to a BBC computer and may wish to be involved,' said CableTel's John Proctor. He also forsees subscribers accessing directly, via a modem link.

CableTel looked at systems some four or five times more expensive before choosing the *Lynx II* program which runs on a BBC micro or Master. Proctor said, 'The *Lynx* won because it does not tie down costly computer systems, offers a wide choice of lettering, colours and graphics and means we can accept input from many outside sources'. The program was developed by Interactive Research of Ascot, Berkshire.



Community TV involvement

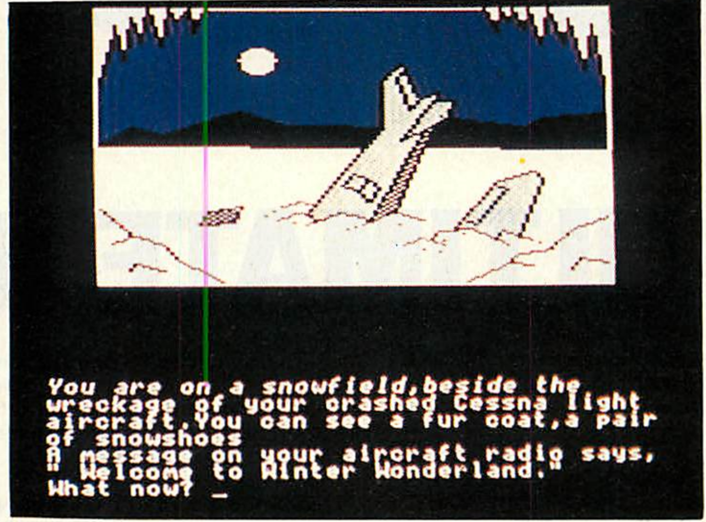
Initially CableTel will use the system to display the programme guide for its 28 channels, as well as on its community channel noticeboard where news, advertisements and information about local events and organisations will be displayed.

Edward Detyna, consultant at Interactive Research, said of the Ealing System, 'It promises so much that it could become the benchmark for the emerging cable television industry in this country'.

The system stores two months of programme information for 30 channels and turns out 48 half-hour rolling displays for each day. Advertisements can be inserted and *Lynx II* has advanced segments for composing promotional material.

CableTel made its first live transmissions in November 1986. The network will be within reach of 100,000 households when completed and as well as the community channel, CableTel is offering a wide range of TV fare from around the world.

Yeti another adventure



Incentive's £7.95 game used the *Graphic Adventure Creator*

Winter Wonderland is the latest release from Incentive Software. The game is set in the Himalayas, where your light aircraft crashes while you are attempting to find a lost civilisation which runs parallel to our own. Your objective is then to escape back home.

Tubelink special interest sections

Tubelink, the Prestel database for BBC micro users, is to launch two more new special interest groups (SIGs).

NETlink, on *2582186#, is for Econet users and will provide news and comments, telesoftware, contacts and technical assistance. Master512-link, on *2582184#, will be edited by Chris Gibson and amongst other things could provide regular updates on software compatibility.

Gemini again

Minerva Systems has taken over distribution and support of *Datagem* and the *Triple-D* business suite from Gemini. Barry Stearn of Minerva designed the packages.

STREAMER

MD402C

COMBO

MD802DM

NUCLEUS 20/
ARCHIVE

MD200B

MD402E

MD802F

MD400G

MD200A

OF MEMORY DEVICES

MODEL	DESCRIPTION	PRICE	MODEL	DESCRIPTION	PRICE
MD400A	SINGLE 400K 40/80 T DS DD	£139.95	MD802F	DUAL 800K 80T 3.5″ DS	£219.95
MD200A	SINGLE 200K 40T DS	£115.95	MD400G	SINGLE 400K 80T 3.5″ DS PSU	£154.95
MD200B	SINGLE 200K 40T DS PSU	£129.95	MD802G	DUAL 800K 80T 3.5″ DS PSU	£249.95
MD400B	SINGLE 400K 40/80 T DS PSU	£154.95	HD2000	20MB HARD DISK WITH PSU	£749.95
MD402C	DUAL 400K 40T DS DD	£229.95	HD4000	40MB HARD DISK WITH PSU	£1199.95
MD802C	DUAL 800K 40/80 T DS DD	£269.95	UFD2000	20MB HD 1MB FLOPPY PSU	£949.95
MD402E	DUAL 400K 40T DS PSU	£249.95	STREAMER	10MB STAND ALONE STREAMER	£749.95
MD802E	DUAL 800K 40/80T DS PSU	£299.95	COMBO	5.25″ 40/80 T 400K & 3.5″ 400K	£269.95
MD802DM	800K 40/80 T DS PLINTH & PSU	£324.95	NUC 20	20MB HD 10MB TAPE 1MB FLOPPY	£1599.95
MD400F	SINGLE 400K 80T 3.5″ DS	£125.95	ARCHIVE	10MB STREAMER & 1MB FLOPPY	£949.95

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Dealer Enquiries Welcome



An Akhter Group Company

Plenty at Hi-Tech for BBC users

Both Cumana and Micro Express will have new disc drives.

Cybernetic Applications will be demonstrating educational robotic equipment.

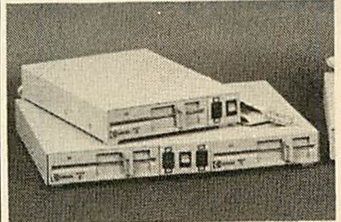
Digital Delicatessen will be showing its £150 P-LAT four-colour plotter. Eltec Services have an Advanced Interactive Video System and Domesday material networking. Simnetts will also be showing Domesday.

Linear Graphics will be demonstrating Linscan, which with a BBC micro scans printed images for processing.

Polaroid will be showing a computer image generator which enables rapid production of visual aids from graphics.

On The Computer Junk Shop stand there's second-hand kit.

Lego will be showing their new introduction to control technology; Fischertechnik industrial models for programmable control can be seen on the Economatics (Education) stand.



New Cumana drives

Denford Machine Tools will show their Starturn lathes, which run from BBC micros.

Robotic and control systems will be in action on Commotion's stand. Harris Looms will be giving a first showing of their *G2* weave planner program.

Microvitec will be showing their successful Touchtech 501 for special needs education.

The Times Network Systems will show a new teaching method that requires only a telephone line, computer and modem.

Fernleaf Educational Software will show its new range for the 6 to 13 + age group, also Logotron has a new range of software. Viglen will have hardware.

THE THIRD HIGH TECHNOLOGY AND EQUIPMENT IN EDUCATION Exhibition 87

High tail over to Hi-Tech

Education Secretary Kenneth Baker will open the Third High Technology and Equipment in Education Conference and Exhibition at the Barbican Centre, London, on January 21.

The event's organisers are expecting some 23,000 visitors to view educationally oriented products on show from around 200 exhibitors, including many well known education suppliers such as E J Arnold, Griffin & George, Acorn, and BBC Publications, plus household names like Lego, Polaroid and British Gas.

The exhibition concerns education in the broadcast sense: there will be equipment on show for primary, secondary, further, higher and special education sectors, and for commercial and industrial training.

Visitors will be able to view computer hardware and software, books, cameras, lathes, CAD systems, robots, energy management systems, control systems, interactive audio and video learning systems, networks and much else besides.

Many exhibitors will be launching new products, while others have special show offers available only to visitors to Hi-Tech. The opening address will be given by Kenneth Baker; other speakers are Fred Jarvis, General Secretary of the NUT, and Tony Webb, Director of Education and Technology for the CBI.

Sponsor of the exhibition, which runs from Wednesday January 21 to Saturday January 24, is the British Educational Equipment Association. Admission is restricted to professionals within education and training. Children will not be admitted.

Come and see *Acorn User* and *School Computer User* on stand number 144.

Interspan: no hands mail

by Ron Keeley

SJ Research's Interspan electronic mail system will be previewed at the High-Technology show.

Interspan, previewed in last month's *Acorn User*, is a 'hands off' system designed to operate with auto-answer modems. Subscribers will not have to dial into Interspan either to collect or send mail. Instead, Interspan dials the subscriber's auto-answer modem, automatically delivering incoming mail and collecting outgoing messages.

The system is file based and will handle text files, wordprocessor files or program files. It is compatible with Acorn products and the software is written to be compatible with the X400 specification to ensure intergration into future electronic mail systems as well as with local network mail.

Projected charges to subscribers are a joining fee of £25, subscription of £12.50 per quarter, and mail charges of 3p for the first 1k of code and 2p for subsequent 1k blocks. Host software for either disc or Econet operation is supplied on joining.

An attractive feature of Interspan is its ability to produce frequent, accurate cost reports. Subscribers may work to a budget either by paying in advance or by assigning a limit to the monthly bill and Interspan will deliver cautionary notes as the budget ceiling is approached.

Although the system will initially be limited to schools and colleges, it is hoped to open subscriptions to the public later in 1987. With the ever decreasing cost of auto-answer modems, SJ Research believes Interspan will prove a popular, effective alternative electronic mail systems, with its low cost offsetting the speed disadvantage of overnight only operation.

Fileserver doesn't tie up a micro

Acorn's Filestore, a stand-alone network fileserver, will be previewed at the exhibition.

Filestore is a true stand-alone system and requires neither keyboard nor monitor.

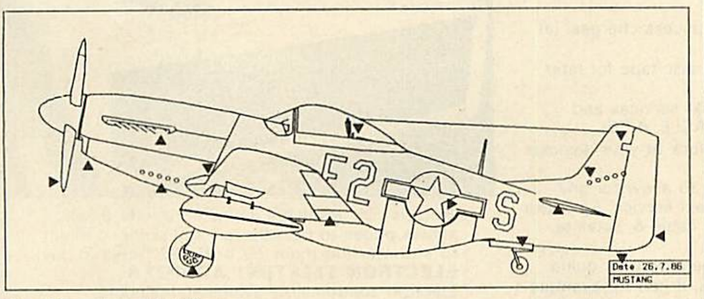
As well as saving money, the system is far easier to operate. There are no complex start-up procedures, due to a battery-backed memory which holds the factory-set default parameters.

The system provides all fileserver processing functions and includes a 20 Mb hard disc and printer server with parallel port. It is fully compatible with Level 3 fileservers and can service up to 80 stations.

Acorn spokesman Laurie Hardwick claimed that Filestore will prove significantly faster than existing fileservers: 'For accesses to files of around 1 Mb we have noted an increase of approximately a factor of six, and it is about three times faster with some applications packages'.

At £1500 plus VAT, Acorn claims Filestore offers a saving of £600 over a Turbo Master with monitor set up to run as a dedicated fileserver.

Mustang and barcode winners



The 15 points of difference

October

Copies of Technomatic's *Novocad* computer aided design package are on their way to the following readers whose entries in October's Spot the Difference competition were correct:

G Bell of Kingston-Upon-Hull; Dr J Simpson of Dunston-on-Tyne; D Winterson of Holmes Chapel, Cheshire; C Burbidge of Abingdon; M Baldock of Great Dunmow; I Humphreys of Stoke-on-Trent; S Wise of Poole; C Williams of Coventry; T Baker of Woking and L Hadden of County Tyrone.

November

The correct answers to the Barcode Competition, November 1986 were:

SAIL THE YACHT
FOLLOW ME HOME
SIMPLE SIMON SAYS

The senders of the first five correct entries out of the bag, who each win a Bar Code Reader, are:

H Greenhough of Dereham, Norfolk; B Newsam of Sheffield; J Marshall of Lincoln; G Moore of Oakley, Bedfordshire and J Bryant of Cardiff.

Well done.

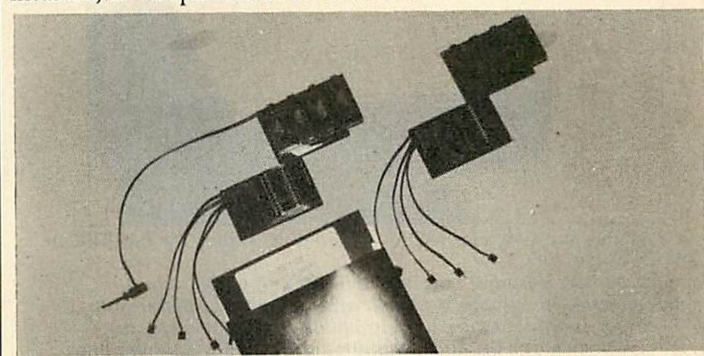
Blunderbox

● The ends of a few lines were cut off David Atherton's Desktop listing on page 128 (December). They should be as follows.

```
 2740 IF t$="" THEN ENDPROC ELSE PROCerr(
"No comma in "+t$)
 2750 MN$(x,y)=FNstrip(LEFT$(t$,comma-1))
 2760 file$(x,y)=FNstrip(MID$(t$,comma+1)
)
 2770 IF d%=0 THEN MN$(x,y)=FNstrip(MID$(
MN$(x,y),5))
 2810 IF ASC A$=32 THEN A$=MID$(A$,2):GOT
O 2810
 2820 IF RIGHT$(A$,1)=" " THEN A$=LEFT$(A
$,LEN A$-1):GOTO2820
```

● On page 87 in January, we mentioned *Kiddie Art* listings 3 and 4, but there was eventually no room for them in the yellow pages. They are not needed to run the program, they just create a sample picture. Just send an SAE to our usual address, 141-143 Drury Lane, London WC2B 5TF and we'll gladly send a copy if listings 3 and 4. They also appear on the monthly disc and cassette.

● The wrong caption appreared under the photo on page 151 in January, the sideways RAM and ROM article. The photo actually showed the Terrell and IFEL Modules, and, just for good measure, it was printed back to front.



The real Peartree MR 4200 32k RAM and MR 3000 ROM boards

● The January competition diagram was correct, but the explanation stated that to get those 15 from a standard set, you needed to remove the blanks. It should of course have added that the doubles also had to be taken out.

POST A PROBLEM

Acorn User has a guaranteed fast reply service for enquiries. Your answer will be returned within 10 working days for just £3 (includes VAT), or your money back.

The idea is simple. Just write out your problem, fill in the coupon (right), and send both off to *Acorn User* with a stamped addressed envelope and cheque or postal order for £3. (If you want recorded delivery, add the cost of this on. The same goes for overseas readers.) Include as much detail as possible and a disc or cassette if a program is involved – with enough space to record any corrected listing.

We will then answer the problem and return all material received – within a guaranteed *10 working days* from receipt. If we fail to match this promise your cheque or postal order will be returned with the answered question.

Please note: debugging readers' programs or those from other magazines is a complex task. Unless the problem can be spotted quickly, the service will only be able to make general comments or suggest a strategy for the reader.

ACORN USER READER SERVICE
141-143 Drury Lane, London WC2B 5TF

NAME ______________________

ADDRESS ______________________

____

____

______________ POSTCODE ______________

Daytime phone number ______________________

I enclose a cheque/postal order for £3 and an sae with my problem.

OFFICE USE ONLY Date in:
Date out:
Answered by:

MORLEY ELECTRONICS

TELETEXT

NOW INCLUDING ATS (ADVANCED TELETEX SYSTEM) ROM

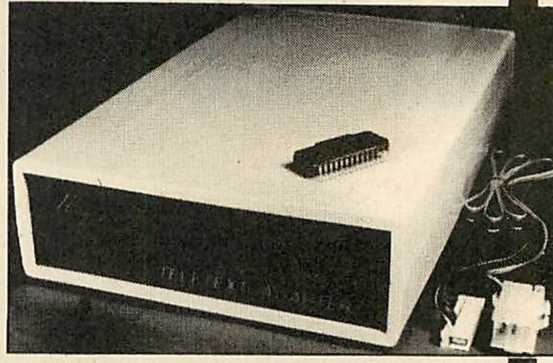
The Morley Teletext adapter introduces you to the world of Teletext at a price that wont break the bank. Inside it you will find the latest in second generation Teletext chip technology, which unlike our rivals who are still using chips designed more than eight years ago, will be fully compatible with any future advances in the Teletext system.

With the Morley adapter you will get a unit that automatically tunes itself in to the required station (no more messing around with screwdrivers in the back of the case), a user friendly menu driven program, easy to follow instructions and a 12 month warranty. Add to this the free downloadable telesoftware and we are sure that you will agree that we are offering you one of the best bargains on the market today.

For technical details please ring Morley Electronics on Tyneside (091) 262 7507 after 4.00pm

FEATURES

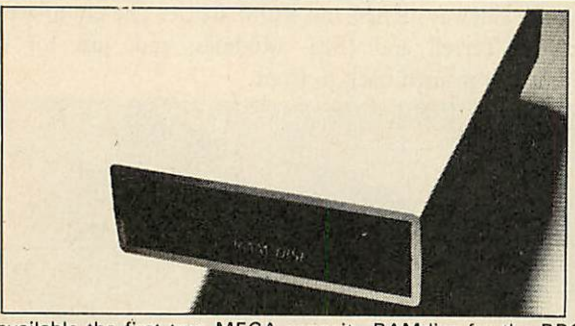
- Advanced design uses the latest technology will handle ANY future enhancements to the Teletext system eg: full field: 8 bit data transfer: 2k pages etc.
- Simply plugs into the user port.
- Low power consumption, less than 200ma. Optional power supply available.
- User friendly menu driven software including extended OSCLI and Osword commands for access from BASIC programs.
- No user-RAM required (PAGE remains at default value).
- FREE Telesoftware, no access charges. (at present updated weekly.)
- Save selected pages to disc/tape for later retrieval.
- Full access to all Teletext services and channels eg: CEEFAX, ORACLE, 4-TEL.
- Gives you a real-time clock at your disposal (*TIME).
- Free software upgrades to allow for any enhancements to the teletext service. Eg: extra channels, full field data on cable & satellite systems etc.
- Easy to follow comprehensive user guide.
- No hardware limitations, it can for example receive virtually unlimited numbers of channels.
- Works with Solidisc SWR.



- Utils disc available including printer drivers allows pages to be selected and dumped direct to a printer (no more TV or Radio Times to buy).

ELECTRON TELETEXT ADAPTER

Electron adapter now available, including emulated Mode 7 allowing you to run long Adventure type programs. Please ring for details.



Now available the first true MEGA capacity RAMdisc for the BBC or MASTER computers.

This fully compatible unit, currently available in either 1 or 2 megabyte versions comes complete with operating software on ROM, power supply, battery backup and a comprehensive user guide, add to this our usual 12 months no quibble guarantee and we're sure you'll agree Morley have done it again.

FEATURES

1 Megabyte of RAM connected to the 1 MHz bus.

Used with the supplied ROM software programs and files may be saved and loaded from the RAMdisc in the same manner as from a floppy disc with a large increase in speed, for example, a 20K mode 0 screen takes about 3-4 seconds to load from disc and about 0.2-0.3 seconds to load from the RAMdisc.

The RAMdisc ROM operates as a utility ROM working with the current filing system rather than as a separate filing system. Therefore ensures compatibility with any Acorn compatible DFS (not ADFS).

The RAMdisc can be selected by a * command to take the place of any drive number from 0 to 9. If the RAMdisc replaces a floppy drive as 0 for example, all commands addressed to drive 0 will be intercepted by the RAMdisc. The default drive no. is 4.

'Dangerous' * commands such as *COMPACT, *COPY, *BACKUP etc are intercepted and the BBC's RAM from page 2 to &7FFF is saved to RAMdisc workspace, and may be recovered using a * command. This prevents accidental corruption of any programs/data in RAM you may have been using at the time. The save operation delays the * command by just under 0.4 seconds. The BBC's RAM can also be saved by an interrupt-driven routine which can be enabled by a * command.

The 'filing system wedge' ROM supplied supports load/save, byte file access, all relevant OSFSC commands, and contains a formatter, verifier and 'sector' editor for use with the RAMdisc.

Catalogue structure allows up to 2,709 files.

EPROM PROGRAMMER now available programs 8, 16 and 32k EPROMS connects to the user port software available on rom or disc.

Version 1 economy uncased with standard DIL socket.

Version 2 deluxe cased with ZIF socket.

DESFAX 7 – Now you can run your own TELETEXT service! Incorporates the powerful editing facilities of DESIGN 7, again with Teletext adapter interfacing.

Stores up to 100 of your screen designs on a 40Tk disc or 200 on an 80Tk. Page selection by 3-digit number HOLD, REVEAL, page linking, individual page delays etc.

PLUS – a powerful CAROUSEL facility permits continuous slide-shows. Only one disc access for every 16 screens – reduces wear on drives. Smooth animation, variable speed text printing, built in printer dumps. Sample data disc and 22 page manual included. Beats all other systems for ease of use and versatility.

M/B software DESIGN 7

Easily the best value Mode 7 screen designer on the market today. Design any mode 7 screen, from simple MENU pages to full CEEFAX standard. This program is an invaluable aid. Designs can be saved to disc as automatically numbered files or the program will convert the screen into a Basic Proc.

INTERFACES DIRECTLY WITH ADAPTER allowing CEEFAX-ORACLE pages to be selected and dropped into editor screen for alteration, saving, or conversion to BASIC. Allows channel change from within program.

M/B software MASTER COPY

. . . the selective copier **you** need for the BBC MASTER computer . . .

Dramatically reduces the time taken to copy unprotected discs,

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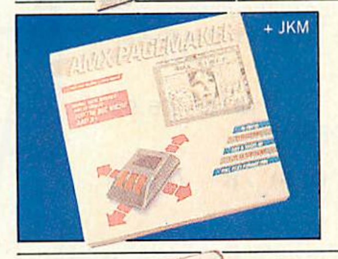


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MAX 16K Rom — £19.95

MAX provides an easy to use graphic based front end to your computer's disc filing system including a comprehensive set of disc management operations such as cataloging, copying, deleting and re-naming, you can also run programs from within MAX. Available for the BBC, B+, Master 128 and Master Compact. Please state version when ordering.





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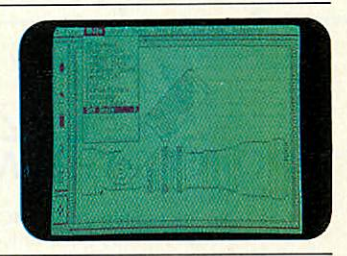


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AMX DESIGN 32K Rom and Disc — £69.95

A highly sophisticated CAD package allowing drawings such as a PCB design up to the most intricate architectural drawing.

Advanced features include full zoom and macro facilities, 58 x 58 screen canvas, fully supported printer and plotter output. (Launch date Feb. 1987). Available for the BBC, B+, Master 128 and Master Compact.



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*These programs are only suitable for use with the original AMX Art/Rom which can be purchased with a mouse for **£69.95**

A Mouse (only) can be purchased for **£34.95** direct from AMS, using the order form enclosed in each of the four major software packages (see screen shots).

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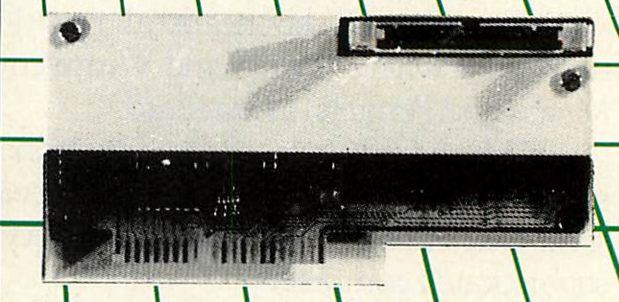
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AMX PACKAGE

Plug the MOUSE into the user port, and the EPROM into your A.P.5. The latter contains fast machine code routines for creating on-screen windows, icons and pointers. And means that the MOUSE buttons can be programmed for use with commercial software such as Wordwise and View. There are two manuals included, explaining how to operate the MOUSE and the ROM routines, which are available in both basic and machine code programs.

Included in the package are two superb programs:

AMX ART has to be seen to be believed! It's a computer-aided drawing program that's just as good for serious applications - such as the preparation of detailed architectural and engineering drawings or teachers' worksheets - as it is for having lots of family fun! And if you're artistically inclined, you'll be astonished at the quality of work you can produce and save. It makes full use of on-screen menus, pull-down menus and icons: the ideal, easy way for novices to learn and gain in confidence.

ICON DESIGNER is an invaluable program for creating and storing icons for use in your OWN programs.

The ACP/AMX mouse package may be used on an ELECTRON fitted with a PLUS I & AP5. The 'ART' software is supplied on cassette but can be transferred to DISC (DFS not ADFS)

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The following systems come complete with the BBC Master and drives fitted in the Viglen Master Console unit.

Stock Code	Description	Price inc. VAT
V250	Viglen Master System 1 This system includes: BBC Master128K in Console unit Single 400K (760K double density) 40/80 disc drive. Philips BM7502 Hi Res Green Screen Monitor	£689.00
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Other systems can be tailor made for your requirements, 3½" drive can be supplied instead of 5¼" at the same price. Please call.
To complete the system you only need to add a printer from any of the range. The current special offer printer that's particularly suited to the packages is the Centronics GLP at £119.95 inc. VAT.
Please add £12.00 for insured courier delivery.

DISC DRIVES

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The finest Japanese disc drives (not Taiwanese immitations) available at the lowest prices.



All disc drives are supplied with a manual, packed utilities disc and a full 12 Months warranty (2 Year Warranty available) and are ready to plug in and use on a BBC B (fitted with a DFS) B + or Master micro. 40/80 Track drives have a switch which enables operation in either 40 or 80 track mode.
The capacities quoted are given in single density mode; for double density mode (1770 DFS + ADFS as in the Master) the capacities should be approximately doubled.
An integral power supply is not necessary as the disc drives run from the micro's power source however should you require drives with their own power supply please add the price of the integral power supply to the price of the drive.
If your BBC B micro does not have a DFS fitted then you will also require the Acorn dfs kit.

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V014	Single 400K Viglen 40/80 Track Drive	£99.00
V019	Dual 800K Viglen 40/80 Track Drive	£189.00
V001	Single 100K Viglen 40 Track Drive	£89.00
V060	Single 3.5" 400K Viglen Drive	£99.00
V061	Dual 3.5" 800K Viglen Drive	£189.00
V096	Integral power supply for single Drive	£22.00
V097	Integral power supply for dual Drive	£24.00
V095	Integral power supply for 3.5" Drives	£24.00
V098	External power supply for dual Drives	£29.00
V502	Acorn 1770 dfs kit or 1.2 DNFS	£49.95
V503	Acorn ADFS Rom	£29.95

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FLOPPY DISCS



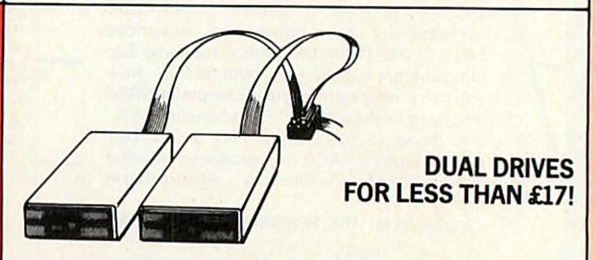
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V114	Special offer 80 track double sided	£16.00 (per box)
V135	3M 3.5" 80 track double sided (3.5, DS)	£31.00 (per box)
V136	3M 3.5" 80 track double sided (3.5, DS)	£3.50 (Each)

Please add £2.00 P & P.

DUCKS



DUAL DRIVES FOR LESS THAN £17!

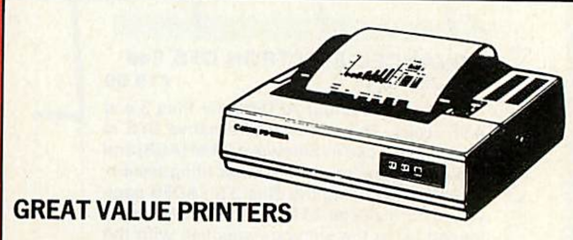
The Viglen Data DUCK (Dualling Up Connector Kit) converts any two single drives to a dual drive instantly. Simply plug the duck into the micro's disc drive socket and plug two single drives (any type and any make) into the duck to obtain a dual drive system accessed as drive 0 (and 2 if double sided) and drive 1 (and 3 if double sided). If neither single drive has its own power supply then you will require a Viglen power DUCK in order to obtain two disc drive power sockets from the micro.

★ No soldering simply plugs in.
★ No need to take disc drives apart to change links.

Stock Code	Description	Price inc. VAT
V084	Viglen data duck	£16.95
V085	Viglen power duck	£8.00

Please add £2.50 for P & P.

PRINTERS



GREAT VALUE PRINTERS

Stock Code	Description	Price inc. VAT
Dot Matrix Printers		
V410	Canon PW1080A/TaxanKP810	£259.00
V409	Centronics GLP	See Special Offer Box
V420	Epson LX86 with tractor feed	£269.00
V421	Epson FX800	£379.00
V422	Epson LQ800 (200 cps)	£559.00
Daisywheel Letter quality printers		
V400	Juki 6100	£279.00
Ribbons		
V462	Canon PW1080A/Taxan KP810 ribbon	£5.95
V463	Epson MX80/RX80/FX80/FX85 ribbon	£6.00
V464	Centronics GLP ribbon	£3.95
Printer cables		
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PRINTER STANDS

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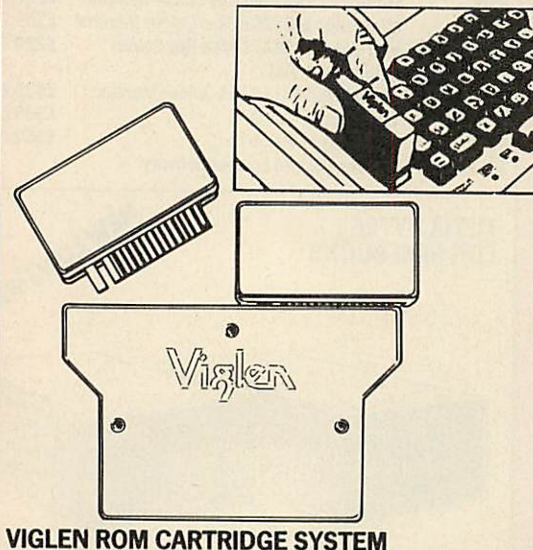
NEW LOW COST PRINTER STAND

The Viglen low cost 80 column printer stand is made in high impact ABS plastic colour matched to most printers. It raises the printer high enough to put continuous stationery (up to 1000 sheets) underneath.

Stock Code	Description	Price inc. VAT
V492	Viglen low cost 80 column printer stand (15" × 14" × 5")	£12.95

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CARTRIDGE SYSTEM



VIGLEN ROM CARTRIDGE SYSTEM

Having fitted the Viglen Rom cartridge system to your BBC, Master or Master COMPACT, you can plug in your Roms/Eproms simply by inserting each one in a Viglen cartridge and plugging in whichever cartridge you want to use. The same Viglen cartridge can be used on all the micros mentioned and there is no need to switch the micro on and off between cartridge changes.

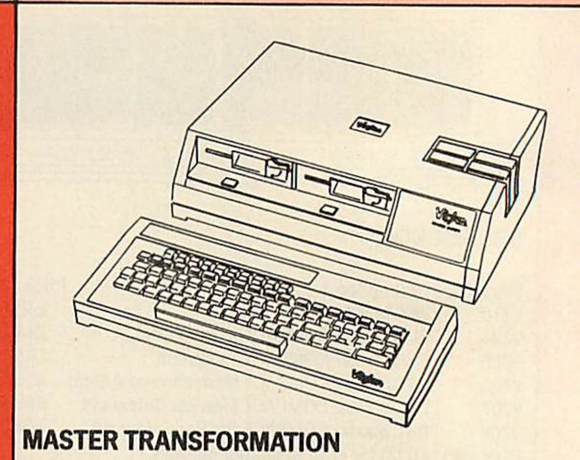
The Viglen cartridge system for the BBC micro consists of the cartridge cable assembly and socket, blanking off plates, 1 cartridge and cartridge storage rack. The cartridge socket when fitted protrudes from the rectangular slot on the left of the keyboard where the cartridges are subsequently inserted. It is simple to fit and requires no soldering.

The Viglen cartridge system for the Master and Master COMPACT simply plugs into your Master cartridge slot (or COMPACT expansion port) and accepts two Viglen cartridges. On the Master you can plug in up to two Viglen cartridge systems thus giving you access to 4 Viglen Cartridges simultaneously. The system comes complete with 2 cartridges and cartridge storage rack. On the Master you can also use Viglen cartridges which have 32 and 64K paged Roms inserted.

Stock Code	Description	Price inc. VAT
V560	Viglen Rom cartridge system for BBC	£12.95
V559	Viglen Rom cartridge system for BBC (low profile)	£12.95
V550	Viglen Rom cartridge system for Master	£14.95
V551	Viglen Rom cartridge system for COMPACT	£14.95
V561	Single Viglen cartridge	£1.99

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CONSOLE SYSTEM



MASTER TRANSFORMATION

Give your BBC Master micro the professional PC look by replacing your existing lid with this smartly styled package. The system is strong and constructed in high impact ABS colour matched to the BBC Master and it gives your Master a very neat and impressive look.

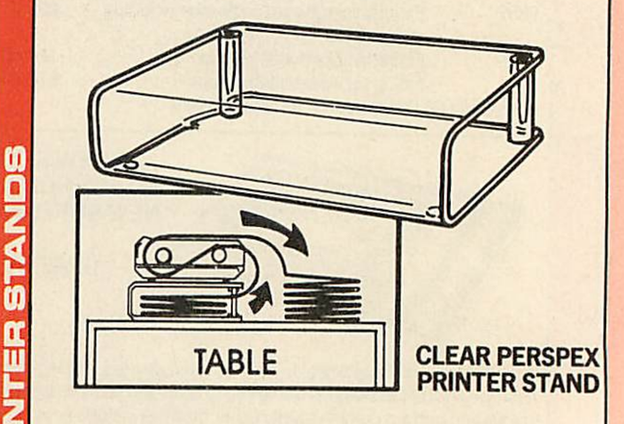
* Will support monitors including up to 16" TV.
* Can house two 5 1/4" disc or Winchester drives.
* Capable of housing 3 1/2" drives.
* Will accept Acorn cartridges and the Viglen Master Cartridge system.
* Full internal metal screening.
* Also available with fitted drives (5 1/4", 3 1/2" or Winchester) or as a complete system including the Master.

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Remote keyboard case with 1.2m cable.
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Two switches which can be used for 40/80 track switching and can be either fitted on the front or rear of unit.
Two blanking plates to blank out any drive aperture that is not used.
Full labelling kit.
Fully illustrated fitting instructions.

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V854	Dual Drive power cable for console unit	£5.00
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PHILIPS COLOUR MONITOR

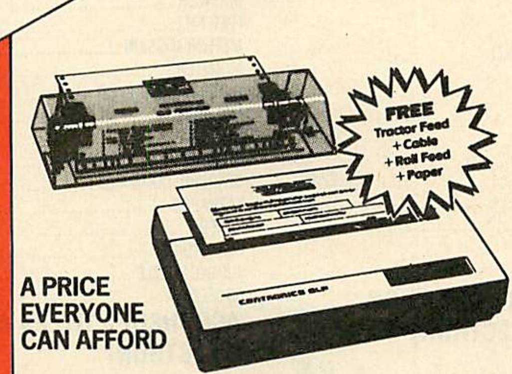
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This sleek looking colour monitor features the following:
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(stylish accessories for the BBC Master)



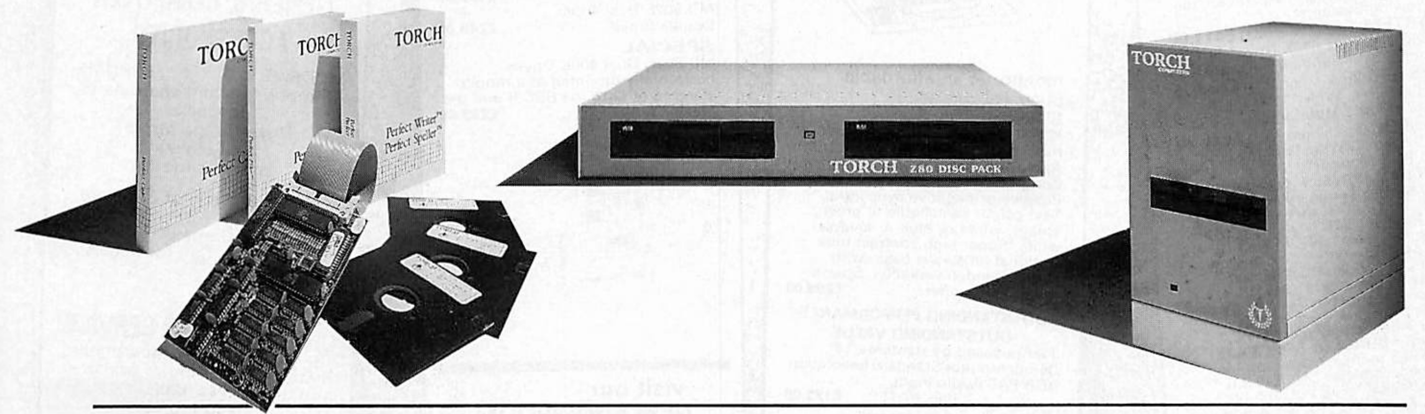
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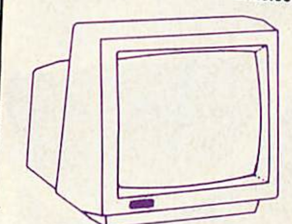
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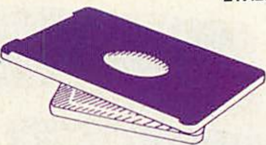
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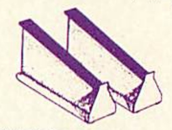
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As System 1. With *14" Medium Res. RGB Monitor*

SPECIFICATIONS: ★ Compatible with Master Series micro subset ★ 128K RAM inc 64K sideways RAM ★ 64K ROM inc 32K MOS, 16K BASIC ★ Up to 4 internal ROM sockets ★ 3.5" 640K formatted disk drive ★ OUTPUTS: Video/RGB/Printer/ Mouse or Joystick ★ Disk drive ★ (optional) Econet ★ Serial ★ 5V power from disk drive module ★ Usual 8 BBC disply modes inc. Mode 7 ★**BUNDLED SOFTWARE:** Pull down menus * Desk top inc. note pad, calculator * VIEW 3.0 * CARD INDEX * Full LOGO * BBC BASIC 4.0 * ADFS + Utils * Welcome suite * Tutorials * (1770 DFS under licence)

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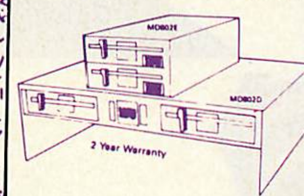
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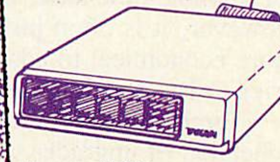
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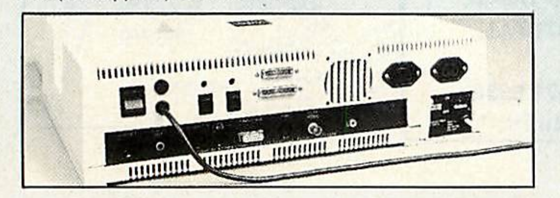
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MASTER TRANSFORMATION
The Viglen Master Console

Give your BBC Master Micro Computer the professional PC look by replacing your existing lid with this smartly styled package. The system is strong and constructed in high impact ABS colour-matched to the BBC Master, it gives your Master a very neat and impressive look.

The photograph shows a fully kitted out back panel with the host of accessories, such as switches, sockets, connectors, etc. (not supplied) but are available.



- ☐ Will support monitor – up to 16″ television set.
- ☐ Can house two 5¼″ disks or Winchester drives.
- ☐ Capable of housing 3½″ drives.
- ☐ Includes two switches (can be used for 40/80 track switching) which can be fitted in the front or the rear. The above photograph shows two front fittings.
- ☐ Will take two Acorn cartridges or two Viglen cartridge system: each system is capable of accepting two Viglen cartridges, thus allowing a total of four Viglen cartridges to be used.
- ☐ Keyboard is separate for ease of use.
- ☐ Full internal metal screening.
- ☐ Supplied with easy, do-it-yourself, fully illustrated instructions or can be fitted by Viglen.
- ☐ Available with fitted drives (5¼″, 3½″ or Winchester) or as a complete system including the master and monitor.

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Offer 3 – 3.5" HIgrade disks

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Life-time Warranty & fully certified

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£139.99	£159.99	100 disks
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Same day despatch – at no extra cost

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Save money by using both sides

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£ 35.99	50 disks
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Top quality British printer ribbons in 6 packs

Printer	Group	6	12	24
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Brother HR15/25/35	696MS	£23.11	£39.58	£67.10
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Epson LX80	454	£16.50	£29.95	£49.97
Epson FX/MX/RX80	273	£23.39	£39.99	£67.93
Epson FX/MX/RX100	320	£33.23	£56.93	£96.31
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Juki 6100	562MS	£18.33	£29.64	£54.54
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A free packet of ten 3.5" DS Discs with each COMPACT" — See page 5 for details

SYSTEM 1 128K, Single 640K Drive & bundled software.	£385 (a)
SYSTEM 2 System 1 with a 12" Hi Res Monochrome Monitor.	£469 (a)
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32016 CO PROCESSOR

For full specification see page 5 — £999 (a)

CAMBRIDGE W/STATION

For full specification see page 5 — £3,450 (a)

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TS10 10 Mbyte Tape Streamer Backup unit with utilities.	£695 (a)
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WINCHESTER Drive Multiplexer TWM2 for two computers.	£99 (b)
TWM4 for four Computers.	£159 (b)

Details on Technomatic Winchesters on page 6

SECOND PROCESSORS

ACORN 6502 2nd Processor	£173 (b)
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Allows BBC computer to control any scientific and technical equipment that conforms to the IEEE488 standard. The interface can link upto 14 compatible devices. Typical applications are in experimental work in academic and industrial labs. — £265 (a)

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(FX85/105 offer limited to current stocks).

EPSON FX800 An enhanced version of FX85. Call for details.	£319 (a)
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EPSON EX800 See details on page 5.	£409 (a)
Colour option for EX800/EX1000.	£55 (b)
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DISC DRIVES

Full details on page 6.
All drives fitted with MITSUBISHI mechanisms.

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TS400 400K/640K	£114 (b)
PS400 400K/640K with integral mains power supply	£129 (b)

5.25" Dual Drives 40/80 switchable:

TD800 800K/128OK	£226 (a)
PD800 800K/1280K with integral mains power supply	£229 (a)
PD800P 800K/1280K with integral mainspower supply and monitor stand	£249 (a)

3.5" 80T DS Drives:

TS351 single 400K/640K	£99 (b)
PS351 single 400K/640K with integral mains power supply	£119 (b)
TD352 Dual 800K/1280K	£170 (b)
PD352 Dual 800K/1280K with integral mains power supply	£187 (b)
PD853 Combo Dual 5.25"/3.5" drive with psu.	£229 (a)

DISC DRIVE MULTIPLEXER

Full specification on page 6.

TDM2 Dual Unit: 2 computers/one drive unit	£75 (b)
TDM4 Quad Unit: 4 computers/one drive unit	£135 (b)

3M FLOPPY DISCS

5.25" Discs in packs of 10

744 40T SS DD	£10.00 (d)
745 40T DS DD	£12.00 (d)
746 80T SS DD	£14.50 (d)
747 80T DS DD	£16.00 (d)

See page 10 for details of Special Offer

(Add £1 for library case packing)

3.5" Discs in packs of 10

80T SS DD	£20 (d)
80T DS DD	£25 (d)

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High quality unlabelled discs supplied in packs of 50 in a storage box. The 5.25" discs have the reinforcing hub rings. These discs are guaranteed for life.

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50 5.25" 80T double sided discs in lockable box.	£45 (b)
50 3.5" 80T double sided discs in lockable box.	£95 (b)

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DB550 Lockable 50 x 5.25"	£9.00 (c)
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Microvitec 1431AP As 1431 + composite video and sound input	£199 (a)
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Microvitec 1451AP As 1451 + composite video and sound input	£259 (a)
Microvitec 1441 High Resolution 895 pixels	£365 (a)

Microvitec 20" RGB/PAL/ Audio Monitors

Microvitec 2030CS Standard Resolution RGB/Comp Video	£380 (a)
Microvitec 2040CS High Resolution RGB/Comp Video	£685 (a)
TOUCHTEC-501 Brings genuine touch screen operation on metal cased Microvitec monitors, incl utilities disc with starter and development programs	£219 (b)
PHILIPS 8501 See page 10 for details.	£139 (a)
TAXAN SUPER VISION II 12" Hi Res/Hi Contrast Option to switch to green/amber BBC/IBM Compatible	£249 (a)
TAXAN SUPER VISION III 12" Super Hi Res and contrast RGB Monitor with option to switch to mono BBC/IBM compatible.	£289 (a)
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TAXAN KX1202G Hi Res Long Persistence (P39)	£95 (a)
TAXAN KX1203A Hi Res amber etched screen	£95 (a)
PHILIPS BM 7502 Hi Res green screen	£75 (a)
PHILIPS BM7522 Hi Res amber screen	£79 (a)

MONITOR ACCESSORIES

Microvitec Swivel Base (14" plastic monitors)	£20 (c)
Philips Swivel Base	£14 (c)
Monitor Stand Models B & B+	£10 (c)
Monitor Stand Master	£13 (c)
Double Tier stand Models B, B+ or Master	£24 (b)
Taxan RGB Lead	£5 (d)
Microvitec Lead	£3.50 (d)
Monochrome BNC/Phono Lead	£3.50 (d)

EPROMS/RAMS

2764-25	£2 (d)
27128-25	£2.50 (d)
6264LP-15	£3.40 (d)

RAM/ROM EXPANSION

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Time Warp with PANOS Utilities.	£39 (d)

MODEMS

(All modems are BABT approved)
See page 7 for modem specifications

MIRACLE WS2000V21/23 & BELL stds	£95 (c)
WS2000 Auto Dial Card	£27 (d)
WS2000 Auto Answer Card	£27 (d)
WS2000 SK1 Kit	£5 (d)
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MIRACLE WS4000 V21/23	£149 (b)
MIRACLE WS3000 V21/23	£295 (b)
MIRACLE WS3000 V22	£495 (b)
MIRACLE WS3000 V22 bis	£650 (b)
WS3022 1200/1200 fd	£395 (b)
WS3024 2400/2400 fd	£570 (b)
BBC Data Cable for WS3000/4000	£7 (d)

PROGRAMMING ACCESSORIES/SOFTWARE

See page 8 for detailed specification
Compatible with B, B+ and Master

EPROMER II while stocks last.	£69 (b)
EPROMER III See page 8 for details.	Approx £119 (b)
MPROMER	£49 (c)
META ASSEMBLER	£145 (b)
PORTAL EPROM EMULATOR 128K	£185 (b)
PORTAL EPROM EMULATOR 512K	£285 (b)
TEAM Disassembler	£145 (b)

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BASIC Version	£59 (d)
Tracker Ball/Mouse Version (TM)	£71 (d)
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TM Version plus Mouse	£90 (c)
Plotter Driver Generator	£21 (d)

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WORD PROCESSORS

VIEW 2.1	£37 (d)
VIEW 3.0	£56 (c)
VIEW INDEX	£12 (d)
VIEW PRINTER DRIVER GENERATOR A utility to generate a View printer driver to suit any printer. Screen driver allows viewing of text exactly as it will appear on paper.	£9 (d)
DOT PRINT PLUS Full details on page 5 NLQ rom for Epson FX/RX, MX and GLP.	£28 (d)
WORDWISE	£24 (d)
WORDWISE PLUS	£38 (d)
WYSIWYG PLUS See page 4 for details.	£19 (d)
INTERWORD (If you own a WW+ then quote your reg number and pay £39).	£46 (d)
WORDEASE A 16K rom based utility for WW+	£24 (d)
SPELLCHECK III A 16K rom based spellcheck program for View and WW. Contains 2000 words on the rom and 6000 (expandable to 17000) words on a disc.	£31 (d)
EDWORD II (Please specify model B, B+, Compact or Master).	£43 (c)

SPREADSHEETS

VIEWSHEET Acorn's spreadsheet provides 255 cols and 255 rows and will operate in any mode. Fully compatible with VIEW and 6502 2nd processor.	£37 (d)
WINDOMATIC See page 9 for details.	£15 (d)
VIEWPLOT A disc based plotting program. (To be released soon).	£22 (d)
INTERSHEET The new spreadsheet from Computer Concepts with many advanced features like 105 col mode, holding several spreadsheets in memory at a time etc.	£39 (d)
INTERCHART Graphics package for Intersheet	£27 (d)
ULTRACALC BBC Publications very popular and well proven spreadsheet rom includes graphics utility disc.	£52 (d)
QUICKCALC A disc based economically priced spreadsheet package (40 or 80T Disc).	£14.50(d)
MINI OFFICE II (for BBC B) A suite of inexpensive but extensive word processor, database and spreadsheet packages. (40T or 80T)	£14.75(d)
MINI OFFICE II (Rom)	£48 (d)

LANGUAGES

META ASSEMBLER Multi processor Assembler full details on page 8	
TEAM DISASSEMBLER	£145 (b)
MACROM A very fast full featured macro assembler rom from 6502 and 65C02 codes, allows use of macros from library disc. Assembly can be disc to memory, memory to memory, memory to disc and disc to disc thus allowing very long source code upto the length of disc in use. About 3 times as fast as ADE and 30% more economical in memory.	£33 (d)
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ACORN FORTH ROM	£39 (d)
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MICROTEXT PLUS Extended Features incl extra memory, control of external devices etc. Rom based.	£229 (b)

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MACROM	£37 (d)
BETABASE	£27 (d)

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ACORN BASIC EDITOR	£22 (d)
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SLEUTH	£23 (d)
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LQ1000 Tractor Feed .... £49 (b)
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8333 FX100+/105 .... £169 (a)
8331 FX80+/85 .... £129 (b)
8330 RX80+ .... £129 (b)
LQ800 .... £129 (b)
LQ1000 .... £159 (b)
EX800 .... £129 (b)
EX 1000 .... £289 (b)

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RX/FX80/80+, FX85 .... £4 (d)
LX80 .... £4.50 (d)
LQ800 .... £8.50 (d)
LQ1000 .... £10 (d)
LQ1000 .... £10 (d)
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FX100 .... £7.50 (d) KP910 £7 (d)

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Aqueous Pen Set six pens .... £18.50 (d)
Oil Based Pen Set six pens .... £25.00 (d)

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RS232 + 2K buffer .... £78 (d)
Ribbon .... £6 (d)

JUKI 6100
RS232 Interfaces .... £65 (d)
Tractor Feed .... £149 (a)
Ribbon (Carbon) .... £2.00 (d)
Spare Daisy Wheel .... £14 (d)
Sheet Feeder .... £189 (a)

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2000 sheets 14½" × 11" £18.50 (£4.50)

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* Interfaces with the BBC through the tube connector.
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A uniquely versatile NLQ ROM for the BBC Micro.

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* **DOTPRINT PLUS** for EPSON FX/RX and compatibles.
* **DOTPRINT DUAL** for EPSON MX range.

MICROJUSTIFIED TEXT

homes of a ruling class whose right to rule was based on the ownership of land. Large estates produced money; perhaps even more important, they supplied people to fight for their

NORMALLY JUSTIFIED TEXT

homes of a ruling class whose right to rule was based on the ownership of land. Large estates produced money; perhaps even more important, they supplied people to fight for their

Notice how MICROJUSTIFICATION eliminates 'stretched' spaces between words.



For price details see page 1.

Compact

BRITISH BROADCASTING CORPORATION
MASTER SERIES MICROCOMPUTER

THE FAMILY COMPUTER

Now available from stock

This low cost high tech computer has developed specially as a computer for home use.

SPECIFICATION

128K RAM, ADFS Filing system, BBC Basic version 4, MASTER style keyboard, a single 640K 3.5" double sided drive. RGB/Mono Monitor as an optional extra.

Bundled software pack includes:

Desk Top Prog with note pad & calculator, VIEW 3.0, Card Index, & LOGOTRON. A set of exciting games and graphic demos.

EPSON PRINTERS

EPSON have launched a new series of printers to update the FX range — world's best selling printer range. The new FX800 and FX1000 range combines printing versatility and superior technical features with the highest standards of reliability. The features include two NLQ fonts, 10, 12, 17 and 20 cpi, dble ht and dble width, 200 cps in draft and 40 cps NLQ, tractor and friction as standard, IBM compatible, full graphics, 8K buffer, Parallel interface.

EPSON EX800/1000 range offers high speed printing to offer versatility in volume printing with speeds of 300 cps in 12 cpi mode. Four colour printing option is available for these printers.

EPSON LQ800/1000 range with its 24 pin print head offers the highest standards in letter quality printing at high speeds while maintaining the versatility of dot matrix printers. The hex density graphics capability produces about the best printout any dot matrix printer can produce.

STAR Power Type

A low cost high quality daisy wheel printer with 165 col, 180 cps. Parallel and Serial Interface as standard, reverse paper feed, left/right margin set and large variety of optional fonts.

STAR NL10

A 80 col 120 cps printer with fine NLQ at 30 cps offers novel and innovative features. There are no dip switches to set, full control from the front console. Plug in interface cartridge simplifies adaptation to different computers. Friction & Tractor feed as standards. Epson Compatible Graphics.

NATIONAL PANASONIC KX P1080

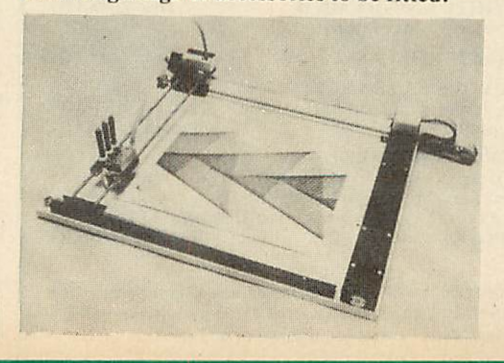
A high performance low cost printer with full character pitch feature 10, 12, 15 & 17 cpi and proportional spacing in both draft and NLQ mode. 80 column, 100 cps draft and 20 cps in NLQ. Parallel interface and Friction and Tractor feeds as standard. Epson Compatible Graphics.

HITACHI 672

* A3 four colour precision plotter.
* Serial and parallel ports as standard.
* Produces 'OHP' transparencies as well as plain paper.
* 'HP' graphics language or single character commands.

GRAPHICS WORKSTATION

A A3 pen plotter with 0.1mm resolution allows graphs, charts, architectural drawings to be plotted using the 9 predefined plotting instructions or by using a CAD package. The pen mount allows a variety of pen types including drawing pens to be used or the following range of accessories to be fitted.



OPTICAL SENSOR

This converts the plotter into a input device and offers a new range of applications: Scan or digitise a picture or a drawing to display or store. Traverse mazes and investigate methods of artificial intelligence. Reliably read bar codes.

DRILL/ROUTER

This will drill holes, machine moulds and cut complex 3-D shapes in a range of suitable materials to a depth of 16mm. Driver software is supplied on disc and an optional application program is available to interface the drill/router to our NOVACAD package.

SCRIBER

The sharp pointed scriber may be used to etch fine line drawings on surfaces such as scraperboard, wax coated copper etc. Full details on request. See page 1 for price.

All accessories available separately if required.

TECHNOLINE
(24 hr viewdata system)
Tel: 01-450 9764

MAIL ORDER
17 Burnley Road
London NW10 1ED
Telex: 922800

RETAIL SHOPS
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Tel: 01-208 1177 Telex: 922800
(close to Dollis Hill ⊖)

West End Branch
305 Edgware Road, London W2
Tel: 01-723 0233
(near Edgware Road ⊖)

For fast delivery telephone your order on 01-208 1177 using VISA/Access Card



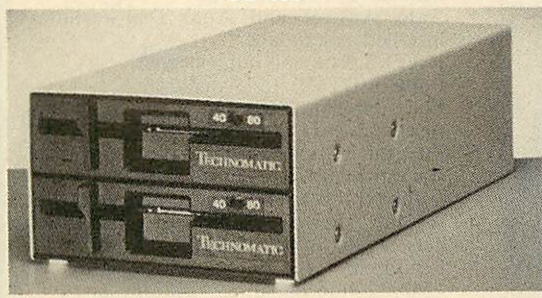

Orders welcome from government depts & educational establishments.

All prices ex VAT.
Prices are subject to change without notice.

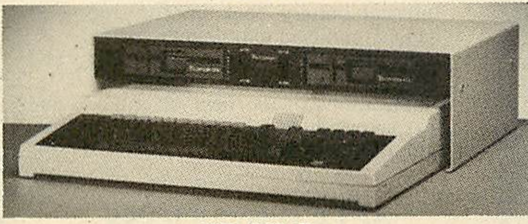
Please add carriage
(a) £8.00 (Datapost)
(b) £2.50
(c) £1.50
(d) £1.00

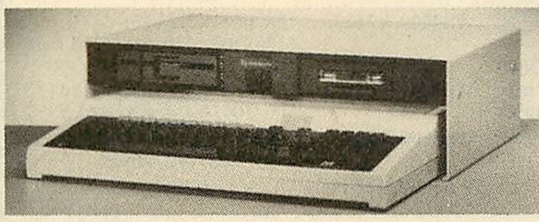


TS 400



PD 800


PD 800 P


P2041 HT

DISC DRIVES

TECHNOMATIC offers a wide range of high quality, high performance drives to meet all needs of BBC micro users. Please see our detailed and competitive price list on page 2.

*All drives are fitted with high quality slim line ultra low power mechanisms capable of single and double density operation and offering very fast track access and head settling times.

*5.25″ floppy drives are fitted with 40/80 track switches as standard at no extra cost. The switches are located in the front and clearly marked to indicate the status at a glance.

*The mechanisms are set inside attractively styled, sturdy metal casings painted in BBC beige colour.

*The plinth version drives provide for a neat and compact system installation giving it a more professional look.

*All drives fitted with all necessary leads and are ready for operation on unpacking. The drives with the mains power supply are supplied with a mains lead fitted with suitably fused 13A moulded plug.

*PD853 Combo drive includes a combination of 5¼″ (40/80T switchable) and a 3½″ 80 Track Double Sided mechanisms. Complete with mains p.s.u. Ideal for software conversion for 5¼″ to 3½″ or vice versa.

WINCHESTER DRIVES

Mass storage 20 Mbyte drives are available in the following versions:

* P20HD Stand alone.
* P204HP With a single floppy housed in a plinth version case.
* P214TS Top of the range with a 10 Mbyte back up streamer and a single floppy housed in a plinth type casing and supplied with backup utilities.
* TS10 A stand alone 10Mbyte streamer for those who are already equipped with a Winchester and a floppy drive. Utilities for backup can only be loaded from a floppy.

All models are fully compatible with Acorn's ADFS system and include a mains psu and the necessary cable connections.

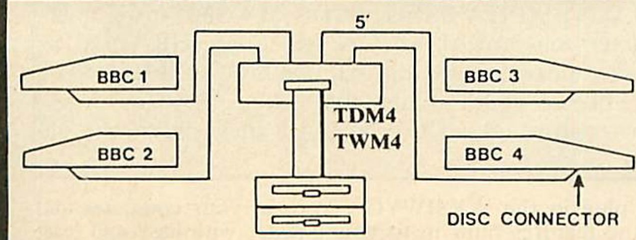
ALL TECHNOMATIC DRIVES NOW CARRY A TWO YEAR WARRANTY

FLOPPICLENE
Disc Drive Cleaning Kit

Floppiclene introduces a positive concept in ensuring continuous high performance of the disc drives by providing an easy and efficient method of keeping the drive heads clean. Use of disposable cleaning discs eliminates the risk always present in reuseable discs of recontamination and abrasion of the sensitive drive heads. Available for both 5.25″ and 3.5″ drives. Please see page 2 for prices.

DISC DRIVE MULTIPLEXER

The cost-effective alternative to networking! A self-contained unit that enables up to four computers to be connected to one single or dual disc drive. No hardware modifications — simply plugs into the computers disc interface connectors. No ROMs or other software needed. All DFS commands work as normal. The switching of drives between computers is totally automatic and completely invisible to the user. This unit is ideal for installing in classrooms and other situations, where networking is not planned or necessary, or where costs must be kept low. In many cases software needs to be shared, although full networking complexity and cost is not needed. Several of these units can be connected in series to allow more computers to access the same discs, i.e. two quads connected together will allow 7 computers to share 1 drive. Units are supplied with 5′ of cable per outlet as standard. Mains powered.



TDM4/TWM4 Quad Unit (up to 4 computers)
TDM2/TWM2 Dual Unit (2 computers)

WINCHESTER DRIVE MULTIPLEXER

A unique addition to our hardware range that allows the sharing of a Winchester between a number of computers. The principle of operation is the same as our highly popular disc drive multiplexers and there is no need for any additional software or hardware modifications. The Multiplexers are available in two versions, a dual unit for two computers and a quad unit for four computers to share a Winchester. Multiplexers are particularly useful for accessing common software and transferring data between the computers. (Not recommended for use with randon access files).

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ESTABLISHED OVER 15 YEARS

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BBC COMPUTERS & ECONET CENTRE

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MODEMS

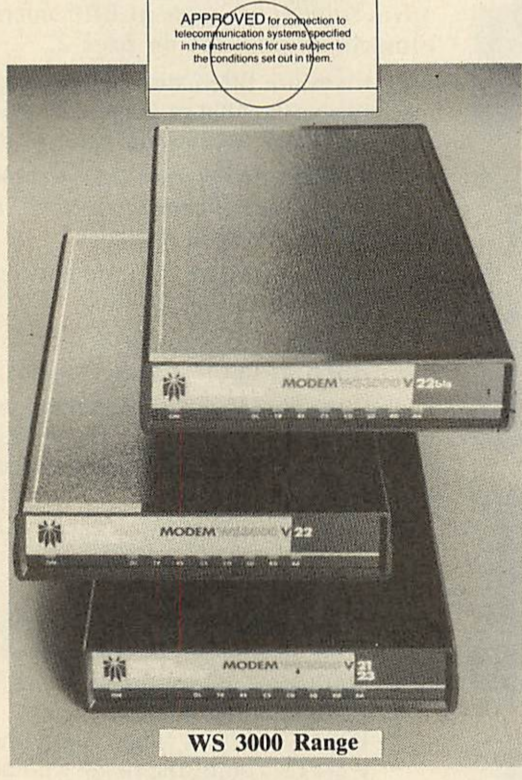
MIRACLE WS4000

* A cost effective intelligent modem that offers the best value for money bringing the world of data communication within easy reach.
* Plain English commands make it simple to use, even for the first time user.
* Latest Hayes-type protocol commands, auto dial, auto answer, auto speed seeking.
* Equalisation model in V23 for line-noise filtering.
* Many other options including upgrading to V22 and V22 bis.

MIRACLE WS2000

* A comprehensive manually switched 'World Standard' modem.
* Competitively price with a capability to be upgraded for various options.
* BT approved for V21/V23, 300/300, 1200/75 and 1200/1200 half duplex.
* Includes BEL103/113/108 standards for use outside UK.

Optional extras include (Not BT approved).
* SK1 chip set for computer control.
* User port cable.
* Auto dial Board.
* Auto Answer Board.
* DS1 disc for auto dial facilities on Commstar.



WS 3000 Range

Miracle have introduced two new models in the WS3000 series for users who require a modem for a specific use. Model WS3022 provides 1200/1200 baud full duplex operation whilst only WS3024 provides 2400/2400 baud fd only.

Please see page 2 for prices

MIRACLE WS3000 RANGE

* A professional range of intelligent modems with full BABT approval.
* Auto Answer and Auto Dial facilities installed as standard.
* HAYES protocols implemented.
* Pulse or DTMF 'tone' dialing.
* Plain English command structure simplifies the use of the modem.
* Integral parallel printer port fitted as standard configurable for both input and output for process control applications.
* A line sharing facility to differential between data and voice calls.
* Intelligent speed buffering converts 1200/1200 terminals to 1200/75
* Equalisation mode for line noise filtering.
* Internal battery back up for storing 63 names, numbers and default settings.
* Upgrade path for 1200/1200 and 2400/2400 and security encryption.
* Applications in the field of graphics and text access, high speed telex, user to user, and user to main frame.

SPECIFICATIONS

WS4000 V2123:	*CCITT V21/V23. *300/300, 600 and 1200 half duplex, 1200/75.
WS3000 V2123:	*CCITT V21/V23/Bell 103. 300/300, 600 and 1200/75
WS3000 V22:	*As V2123 and also 1200/1200 full duplex.
WS3000 V22 bis:	*As V22 and also 2400/2400.

MULTIFORM Z80

A unique Z80 2nd Processor with a 'MULTI FORMAT' capability.



* Multiform Z80 will run most CP/M 2.2 formats on the BBC.
* 28 different formats including Acorn Z80, RML 380Z & 480Z, EPSON QX, Amstrad, Osborne etc, supplied on the library disc with the utility to create additional formats.
* Emulates the two of the most commonly used CP/M terminals, HAZELTINE 1500 and ADM-3a in addition to the Acorn VDU making installation of most of the software packages easy.
* Utility to inter convert ASCII text wordprocessed on a standard BBC and under OS/M or CP/M .
* 8271 allows single density CP/M formats whilst 1770 DFS allows both single and double density CP/M formats. Single or dual drive, 40 or 80 track format and SS or DS drives can be used providing the CP/M format matches.
* Dual drive will allow two separate formats to operate simultaneously for data transfer making it ideal for use in environment where machines with different formats are in use.
* Utility to read and write on IBM PC DOS discs available as an optional extra. Utility will also format a PC DOS disc.
* Multiform Z80 is supplied with a OS/M operating system rom, System disc and a Library disc. Please specify the DFS type and the drive format when ordering.

WYSIWYG PLUS



This new screen/printer utility not only allows you to see on the screen exactly how the text is going to appear on the paper when printed but also simplifies the printer control codes that you need to use to get the different effects.

WYSIWYG+ can be used in BASIC or from within the popular word processor WORDWISE plus.

The printer commands have been simplified to meaningful words so that the user does not have to either remember or keep referring to the printer manual and try to decode the commands to VDU format. For example: *ENGLARGED will display enlarged text on the screen and send the appropriate command to the printer to print in enlarged mode.

Some of the features you could see in WW+ or from BASIC include:
*SUBSCRIPT, *SUPERSCRIPT, *ENLARGED, *BOLD, *EMPHASISED, *CONDENSED (up to 132 characters on screen), *PICA, *ELITE, *GRAPHICS (design your own logos and symbols), *UK, *FRENCH, *US, *TELETEXT (character sets), *BACKSPACE (for overprinting), *DOWNLOAD (new characters or fonts).

Simply plug in the WYSIWYG+ rom in your computer and utilise the features built in to your printer with ease and least bother to produce the results you know are possible but not so simple to achieve. No other single package offers this much flexibility and simplicity to get the best from your printer.

WYSIWYG+ rom is supplied with a comprehensive manual.

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(24 hr viewdata system)
Tel: 01-450 9764

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Telex: 922800

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EPROMER III Eprom Programmer

An enhanced version of the highly successful EPROMER II providing added sophistication to the eprom programming applications on the BBC computer range. The new software also utilises the extra facilities of the BBC Master computer. The programming methods are 'state of the art' of programming technology for fast, efficient and cost effective operation.

The single rail eproms handled by the EPROMER III are:

- 2716 2732 2764 27128 27256 27512 27513 27011 2516 2532 2564 (NMOS & CMOS)
- One time eproms P27XXX, 87CXXX etc.
- Also A suffix eproms such as 27XXXA

The software is menu driven, many operations being single key. On screen help clarifying the operation being carried out. Will make the programming process very simple and easy for both specialists and novices alike.

The main features of the programming software are:

* Device, function and voltage selection from the computer keyboard.
* Continuous display of the options selected.
* All eproms upto 27512 (64K) programmed in single pass.
* Automatic Intelligent identifier support for eproms able to respond.
* Selectable programming voltage 25/21/12.5V
* 3 programming methods: Normal, Intelligent & Pulse (20 sec for a 27128).
* Serial port protocols supported.
* Intel HEX, Motorola S, HEX and ASCII protocols supported.
* DFS, NFS, ADFS and Rom Filing System Supported.
* BASIC/Machine Code programming using RFS.
* Powerful editor with input in HEX or ASCII.
* Full editable 64K file.
* Block move of data within the address range.
* User can select any section of the eprom from single byte to the full address range to blank check/burn/verify. Facility to program single bytes makes program development/amendment simpler.
* Multiple loading for ROM Filing System

EPROMER III interfaces with the BBC through the 1 MHz bus, has a mains power supply and is fitted with a 3M TEXTOOL ZIF socket to provide consistent and reliable service for a long period.

META Version III

"All the good features you would expect to find in a good source code editor are present . . . Meta assembler lives in a different world. It is structured to work with any new processor . . . as new instruction sets can be added . . . as needed . . . has a well featured editor with colour highlighting, a sound modular approach." **Acorn User October 1986**

- Assembles for over 30 popular processors, including Z80, 6800/01/02/04/05/09/11 etc — and 68000 — using native mnemonics for each processor, eg. LD A, (HL) for Z80 and MOV AO, $1000 for 68000 etc.
- Fully integrated Editor: four field, all search, search/replace, block copy, delete, move, marked save, load etc.
- Compatible with Portal Eprom Emulators and Team Disassemblers.
- Send object code in Intel Hex, S-Record, straight binary etc. down to discs, RS232, parallel port, Eprom Emulators etc — all **during Assembly.**
- Over 50 directives included as standard: handling nestable macros, conditional assembly and twenty types of table definition directives.
- 32 bit labels; 31 character names. Arithmetic and Boolean arithmetic to 32 bits.
- Modular source code with numeric and string parameter passing.
- Serial communicator area with eight options lines: echo, control code trap, LF supression/addition etc.
- Over 500 in use throughout the world in universities and many different industries.
- Two 16K Roms, two 80 track discs, A4 ring-band manual, function-key strip.

PORTAL EPROM EMULATORS

- Emulates 2716, 2732, 2764, 27128, 27256, 27512 eproms at 150ns Access time.
- Load at 4Kbytes/second — No "erase" time.
- 28 pin header plugs into Eprom socket on target system — status monitored on 13 Leds.
- Fully software controlled from Meta Assembler.
- 100 times faster than standard EPROM program/erase cycle.
- Fully CMOS compatible; draws no power from target system.
- Four portals may be independently programmed off same user-post cable.
- Complete with all cables, manual and disc.

PORTAL 128 (2716, 2732, 2764, 27128):
PORTAL 512 (2716, 2732, 2764, 27128, 27256, 27512).

MICROPROMER

An add on unit for Epromer II enabling the user to program 8741, 8748 and 8749 single chip microcontrollers. Now with the aid of cross assemblers such as META, the user can write code for the above devices and then with the aid of Micropromer program the device.

* Simple menu structure with on screen help. i.e. select a function and on the screen will appear details of the function being performed.
* Comprehensive error reporting and checking.
* Read, verify, blank check, program from 1 to the maximum byte count for the device being used at any address location.
* Support for DFS, ADFS and cassette filing systems.
* Edit data in Hex or ASCII.
* Total control via software, no switches to worry about.
* Supplied with user manual and software on diskette.
* MPROMER simply plugs into the EPROMER II ZIF socket.

TEAM DISSASSEMBLER

The third part of the Universal Development System: a Meta labelling dissassembler.

Supports 1802, 8080, 8085, HD64180, Z80, 65XX (includes 65 col, 6511 etc), 68XX (includes 00, 01, 02, 03, 08 etc): updates soon for most of Meta processors.

- Up to 64K of object code translated back into META compatible source code modules: labels automatically inserted on all jump targets, memory references etc.
- Pre-editing stage allows marking of object code areas as byte, string, word, long word etc, tables. These areas dis-assembled into appropriate directives instead of garbage mnemonics.
- Reconstituted source code ready for immediate re-assembly by META.
- Omniversal search/replace for re-naming arbitary label names with meaningful ones.

BOOKS

No VAT Carriage Code (c)

LANGUAGES
6502 Assy Lang Prog............£19.95
6502 Programming..............£13.95
8086 Book..........................£23.95
Acorn BCPL User Guide........£15.00
Acorn FORTH.....................£7.50
Acorn LISP........................£7.50
Acorn ISO Pascal Ref Manual.£10.00
Intro to COMAL.................£10.00
Intro to LOGO....................£7.50
Micro Prolog Ref Manual.......£10.00
Introduction to Turbo Pascal..£14.95
Prog the Micro with Pascal.......£8.50
The UNIX Book....................£7.50
Unix User Guide.................£19.95
Understanding Unix.............£18.45

BBC MICRO GUIDE BOOKS
BBC User Guide Acorn..........£15.00
BBC Plus User Guide...........£15.00
Drawing your Own BBC Programs............................£6.95
Inside Information................£8.95
Math Prog in BBC Basic.........£7.95
Toolbox 2..........................£10.95
VIA 6522 Book....................£4.50

PROGRAMMING/UTILITY
Advanced Sidewise Ram User Guide £9.95
Advanced User Guide (BBC)...£15.95
Advanced User Guide...........£12.50
Applied Ass./Lang on the BBC.£9.95
BBC Micro Sideways ROM's RAM's £9.95
Guide to the BBC ROM..........£9.95
Beginners Guide to W.P.........£7.95
View 3.0 User Guide.............£10.00
Viewstore..........................£10.00
Viewsheet..........................£10.00
Wordwise Plus.....................£9.95

SOUND & GRAPHICS:
Mastering Music...................£6.95

DISC DRIVE SYSTEMS:
Advanced Disc User Guide.....£16.95
Disc Book..........................£3.50
Disc Programming Techniques..£7.95
Disc Systems.......................£6.95
File Handling on the BBC........£6.95
Discovering Disc Drives.........£POA

APPLICATIONS:
Interfacing Proj for BBC.........£6.95
BBC and Small Business.........£5.75

PROFESSIONAL SOFTWARE
Wordstar made easy.............£16.95
Introduction to Wordstar.......£17.95
Wordstar Handbook............£11.95
dBase-II for the first time user.£16.95
Understanding dBase-III........£22.95
Multiplan Made Easy...........£18.95
Multimate Complete Guide.....£16.95
ABC of LOTUS 123.............£17.45
1-2-3 for Business................£16.95
Adv Tech in dBase II/III........£22.95
Mastering CP/M.................£17.95
CP/M Bible........................£16.50
Introducing CP/M on BBC & Z80..............................£9.95
MS/PC DOS Prompt............£10.95

8

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NOVACAD

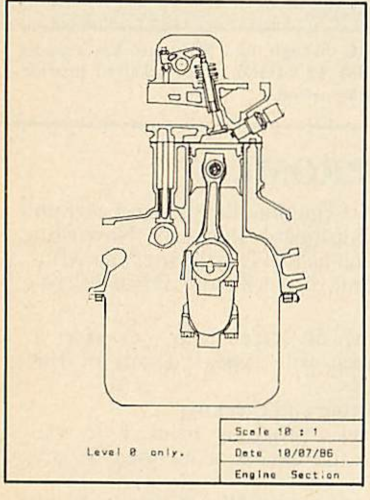
Computer Aided Draughting for the BBC Micro

"The Novacad system is a thoughtfully designed piece of software requiring a minimum of manual bashing so that real results are possible with just a few hours work."

"Novacad is a professional package, well worth the £90 for the ROM and disc and is expandable to suit your own particular requirements. I would have no reservations if I heard Novacad called, "the best on the market"." **A&B Computing August 1986**

A sophisticated CAD package with unique facilities which are generally confined to the professional CAD packages costing thousands of pounds.

NOVACAD is being used in widely differing fields ranging from leading British industries for producing engineering drawings to Accountants' offices for producing flow charts. Architects, engineers, plumbers, kitchen planners and many other professions requiring easy to use facilities for producing professional quality output are making extensive use of NOVACAD's unique features. NOVACAD is proving to be a invaluable teaching aid in technical schools and colleges simply because of the ease with which it can be used.



The major features of NOVACAD are:

* Simple and easy to use with logical command sequence.
* A large drawing area (approx 15 screens).
* The ability to create complex icons (upto 500 lines instead of the usual 15 to 20 pixels), store them in a library and recall them at different scales and orientations.
* A zoom facility allowing magnification of up to 20 times to insert finer details.
* Block copy of shapes on the screen for repetitive use.
* Text entry at any 90° orientation at any position on the screen.
* Create multi layer drawing with 8 levels available.
* Full compatibility with the BBC range with minimal hardware requirements yet having the capability of exploiting the potential of the extra shadow memory or the second processor's memory and speed.
* Printer routine for Epson 80 and 136 column printers.
* A unique facility to output to any BBC compatible plotter.

MINIMUM HARDWARE REQUIREMENTS

- **Any BBC range computer with Acorn DFS.**
- **40 Track single sided single drive.**
- **Epson compatible dot matrix printer.**

With basic BBC B, NOVACAD operates in mode 4 allowing use of any 2 colours. With shadow memory of the BBC+ or the Master, it can also operate in mode 0 for higher resolution or mode 1 for allowing use of any 4 colours, and it will provide additional user memory for more complex drawings.

6502 second processor or the Turbo on the Master will also increase the drawing speed considerably.

NOVACAD
is available in two versions

*BASIC version for cursor control from the keyboard.
*T/M version for cursor control from the keyboard. Tracker Ball or a Mouse.

OPTIONAL EXTRAS

Plotter driver generator is available as an optional extra to configure a plotter routine for any BBC compatible plotter. Pre-configured programs for the popular plotters like **Epson HI 80, Hitachi 672, Plotmate, Penman** and **HP GL.** This program allows the drawing to be scaled to the maximum plotter size thus enabling drawing of A2 and A3 sizes to be produced with equal ease. The zoom facility will enable inaccuracies of drawing on the screen to be eliminated.

ROUTCAD, an optional software package for our Graphics Workstation allows for production of shapes drawn using NOVACAD in 3D on suitable material and is ideal for a range of applications including template making and model building.

NOVACAD package includes a 16K ROM, Utility disc and a comprehensive manual.

NEW

WINDOMATIC



All users of Acorn's VIEWSHEET spreadsheet program will be aware of its powerful windowing facility which allows the screen and/or printer to be configured in upto 10 separate windows taken from anywhere in the sheet. They will also be painfully aware of how difficult and time consuming it is to set up a required display. Although VIEWSHEET allows configurations to be saved to the media, it does not have provision for deciphering them.

WINDOWMATIC has been produced with the intention of recitifying these shortcomings and to bring out the very best from VIEWSHEET.

WINDOMATIC provides a quick and easy way to configure screen and printer allowing complicated documents and reports to be set up much more easily. It displays complete text information on all 20 windows and accurate graphic representation of the screen and printer output.
The package includes a screen dump routine for Epson printers and allows use of other printer dump packages.
The program is compatible with BBC Master, B+ and 6502 and Turbo second processors. It can be entered from VIEWSHEET by use of function keys or it may be run by loading a previously saved window configuration from disc.
The program is supplied on a disc with a comprehensive manual.

LETTERS

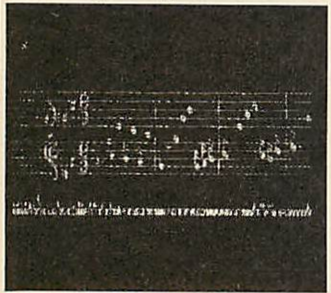
Write to Letters, Acorn User, 141-143 Drury Lane, London WC2B 5TF

MAKING MUSIC

Sir, I read with interest the Joe's Jottings article about computer languages and the review of the Music 5000 in the December edition.

I have bought *Acorn User* since it was launched and have had a BBC micro system and Music 500 for over one year. I use BBC Basic and Logotron Logo, mostly for control purposes and have found an abundance of information, help and guidance on these two languages. However, I have found virtually no information on Ample, the music language.

As my daughter has now



A sample of Music 5000

started the GCSE music syllabus which includes composition assessments, I write or adapt Ample programs for her. For several years we have been promised the Hybrid Technology keyboard and software but this has not yet appeared.

Urszula Ghee
Nottinghamshire

April's *Acorn User* will be a special issue on Music (published in March). Hybrid plans to release a keyboard and programmer's guide in the spring and Hybrid's address is Unit 3, Robert Davies Court, Nuffield Rd, Cambridge CB4 1TP. There is an Ample User Group at 18 Blackmead, Orton Malbourne, Peterborough.

DESIGNER SOFTWARE

Sirs, We refer to difficulties experienced by readers in obtaining software to meet specific needs (P Thatcher and M J Daniels, December).

Our business is the development of computer programs to make the fullest use of the BBC micro and Electron's capabilities while meeting the individual requirements of the firm or private customer. If we cannot produce the ideal program we say so, and will refer the project to another group. No charges are made for any assessment that does not lead to us to writing a program.

Customers should submit their idea in as much detail as possible to us for a no-obligation estimate. We endeavour to reply to all enquiries within seven days. Write to: Allan Data, 1 Horn Road, Dunbeg, Connel, Argyll, PA 37 1QG

A M O'Brien
Argyll

DISABLING THE DFS

Sir, It is possible to disable Acorn's 1770 DFS and ADFS on a BBC micro (B and B+) permanently. The disabling will mean even CTRL-Break will not enable the ROM.

The ROM won't therefore gobble up valuable memory and won't corrupt memory if Break is pressed!

The trick is to use an undocumented feature built in to the DFS (my version is 2.26) and ADFS (version 1.30). Each ROM is allocated one byte in page &D to point to its private workspace. If the DFS's or ADFS's byte has its most significant bit (bit 7) set, the ROM will be disabled.

To determine which byte to alter, first find out the paged ROM number. This can be done by using the *ROMS command on the Acorn DFS (but remember that this command won't be available when the DFS is disabled!), or with an equivalent command.

Then, add the ROM number to &DF0. If the ADFS is in socket 13 (&D), location &DFD should be poked: ?&DFD = &FF followed by Break. I am now happier with the ADFS I have in my BBC micro because I can get rid of the ADFS and keep some valuable memory when I need it. I hope this hint helps someone.

J F Button
Hampshire

You are correct in your assumption the table from &D00 can be used to 'switch off' ROMs. However, your guidelines are not strictly true. First, &FF should be poked into the correct position. &80 will work in most cases, but not all.

You should not poke 0 into the table to switch the ROM back on, otherwise it is liable to crash your system. The table from &DFO is in fact the workspace table and is used by each ROM to keep tabs on where its own private workspace begins. The way around this is to save the original contents and restore these on completion. To disable a ROM on the Master simply use *UNPLUG and then *INSERT to re-enable.

RAM WORRIES

Sir, I have a BBC B+ (64k) and have been trying to find the sideways RAM for ages. Since the User Guide has absolutely nothing on the subject, I have so far been unsuccessful. Even the magnificent *Acorn User* magazine has published nothing of use on the subject!!!

If anyone out there knows anything about the subject, please could you write to: 5 Lady Jane Gardens, North Berwick, East Lothian, Scotland.

I will be very grateful to anyone who who tells me how to use the extra memory.

Here is a short line of program which will make the screen appear to wobble.

```
10 VDU 23,0,5,10,0,0,0,0,0,0
```

Colin Coghill
East Lothian

In a BBC B+ with 64k there is 12k available for use as sideways RAM. In the February '86 issue of *AU* Joe Telford showed how this area of memory could be put to use.

LETTERS

COPYING DISCS

Sir, we are a school with 13 BBC Bs and disc drives in use. We need to use up to 10 copies of educational discs. Is it possible to obtain a licence to make it legal for us to copy commerical educational programes?

A H G Blocksidge
Gloucestershire

In theory, the answer is yes. Most educational software houses will license schools to make copies of software, or arrange a bulk discount.

You should write to each publisher with exact details of your requirements.

TURN YOUR TV INTO A MONITOR

Sir, It has often surprised me that so little prominence has been given to the relative ease of modifying a colour television set so that it performs as a RGB monitor.

Probably most BBC micro or Electron users like myself started off by using the modulator output connected to the aerial input on the TV set. Even with careful tuning the resulting image is very poor. A significant improvement can be achieved by alternatively feeding the composite video signal from the computer directly into the TV video circuit. This eliminates the modulator and also the RF and IF sections.

A far better solution is to use the RGB output. For those who can afford a monitor there is of course no problem. However, many users still employ their TV sets as monitors and miss out on the vast improvement which can be obtained from using the RGB output from the computer. For those who do not wish to delve into the innards of their TV sets I believe some firms in the UK will carry out the modification for them.

Although I have not been able to make a direct comparison with a commercial RGB monitor I can say that I invariably use *View* in mode 3 and experience no difficulty in reading 80 column text. A further enhancement is the use of the *TV command to switch off the interlace. In fact this command as well as the mode 3 command are included in the auto booting of *View*. The result is a rock steady and easy to read screen.

The total cost of the modification excluding labour cost was approximately NZ $28.00 (about £10 sterling) and well worth the effort.

S G Hurst
Mount Maunganui
New Zealand

Details of such modifications may be 'fairly straightforward and not expensive' for some readers, but not for the vast majority. Also such changes are usually very specific to a particular make.

We would not recommend readers to attempt this task unless they are experienced in electronics, and even then advise extreme caution. It may cost a lot more than £10 to have this done by a dealer, but the peace of mind is worth it!

FIRST TIME BUYER

Sir, I am considering buying a BBC computer and as I have no computer experience, I am starting from scratch.

The computer must meet the needs of my family and myself as an aid to education to be used in conjunction with school work.

I also plan to attend a further education course on electrical and electronic science which will involve microprocessors, programming and scientific control work. The course will take you to Higher National Certificate standard.

Of course, the facility for playing games must also be included on a micro. I have seen the newly advertised BBC Master Compact and have also heard of the BBC B, and BBC Master. I wonder if these are compatible with each other and if you are able to take a program from one and use it on the other.

CM Conroy
Dumfriesshire

The fact the BBC series of micros are widely used is a prime reason why many parents buy them for their children. They all run the BBC Basic language (which has also been converted for several other micros), and so programs written on one will usually work on another. This cannot be guaranteed, but there should be no problems with simple programs.

If your HNC course contains a lot of control, then the Master is a better option than the Compact, as the latter has several interfaces taken out. The BBC B is no longer manufactured, although you will see examples for sale second-hand.

It is well worthwhile planning the cost of a disc drive into your spending. Compatibility with a school's micro would be a factor here. Also, if you do buy a second-hand BBC B, make sure it can run a disc drive. Acorn's address is 645 Newmarket Rd, Cambridge CB5 8PD. Tel: (0223) 214411. There is a chain of dealers, two of whom are in Dumfries: Criffel Micro Business Systems, Glasgow Road, Dumfries DG2 0NY and TC Farries, Irongray Road, Lochside DG2 0LH.

PROGRAM COPYRIGHT

Sir, I am writing to ask you for advice concerning the copyright of magazine printed programs. I have written a program which contains a relatively small procedure which appeared in *Acorn User* last year (CHR$ Doctor – June 1985), but I have adapted it to my own requirements.

I also did this with another utility for another magazine. If I decide to sell my program containing such routines, would I be breaking the law? What steps should I take to make sure everything about my program is legal when I decide to sell?

Yatsun Wu
Glasgow

All the programs printed in magazines are the copyright of the magazine and/or author in question. The same goes for routines in published software. Hence, if you do use them you are breaking the law. However, *Acorn User*, and I would hope other magazines, has a policy of waiving rights and passing such requests on to the original author. As a result, there are several pieces of commercial software using routines from *Acorn User* for which little, if anything has been paid. Obviously, if the routine was a major part of the program, the author might well seek a mutually agreed royalty or one-off fee.

So, if you want to be safe and legal, ask the magazine. If you are charged, and you feel it's too much, you'll just have to write your own code to do the job.

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Send this coupon with your remittance in an envelope to Christine Allen, Subscriptions Manager, Redwood Publishing, Lambourn Woodlands, Newbury, Berkshire RG16 7TW.

LETTERS

CLEVER CALIGRAPHY

Sir, Many thanks for publishing the *Calligraphy* program in the September issue. I have put it to use already in a small magazine a friend and I produce. It is excellent for titling and saves on the Letraset!

But onto more serious matters, I have coded a number of different fonts, and am working through the data statements to print out a chess board and all the pieces. If anyone else has been developing fonts, I'd be pleased to hear from them. I include examples of the fonts I have encoded so far, plus the initial designs for the white chess pieces.

I presume that you did notice what I assume to be an error on the disc listing, line 120 C= files$ should be C=OPENIN(file$) otherwise the program doesn't run.

Wallace B Nicoll
Glasgow

It's heart-warming to see such great use being made of *Acorn User* programs. The problem on line 120 looks like a difference between Basic 1 and Basic 2. Basic 1 users should make the change.

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 0123456789 .,:;?! ()" '-$£&
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 0123456789 .,:;?! ()" '-$£&
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 0123456789 .,:;?! ()" '-$£&
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz 0123456789 .,:;?! ()" '-$£&

Some fonts designed by Wallace Nicoll and the chess pieces

GAMES COMPATIBILITY

Sir, I am writing for the benefit of model B+ owners who may have been misled by your games charts in the November issue of your magazine.

First, *Spy Hunter*, from US Gold, does work on the 64k machine. Second, Doctor Soft's *Phantom Combat* will not load. Finally, although *Bruce Lee* from US Gold does not usually work, it can be made to. I do not know if this works on the tape version, but it does on the disc version. Set PAGE to &1700 then load the first part of the part of the program, "BRUCE0", type *SHADOW 1, and delete line 130. Now run the program. The game will load properly.

Simon Bacon
London

READING THE FUTURE

Sir, What ever qualifications you and your staff may have, I am surprised that you are lacking in knowledge both of available software for the BBC micro and the contents of your own publication!

On page 47 of your December issue, Peter Thatcher asks to be put in contact with a company producing a software package for calculating size and deflection of steel and timber beams, and you say, We don't know of any. This statement is surprising because on page 147 of the previous issue you display a quarter-page advertisement by W L Computer Services offering for sale a beam stress calculator program on either disc or tape!

John Ashford
Shropshire

Good point, but one of our qualifications is not foretelling the future!

Production schedules mean we are often putting together pages (and always writing them) before the previous issue is actually published.

BELGIAN ACORNS

Sir, As you regularly publish the address of BBC clubs in your magazine, may we ask to publish ours in the next issue of the magazine?

Our address is:
Acorn User Club Belgium,
Rue des Clématites 9 bte 1,
B-1080
Bruxelles,
Belgium.
Tel: 02/425.12.20.

Georges Wathlet
Brussels
Belgium

THE RIGHT SIGN

Sir, I am writing in response to Heather Smith's enquiry about astrological software.

Recently, I found a source of such software for the BBC micro and other computers. Astrocalc produces astrological software for a wide range of computers. I tried the Basic program for computing the natal chart and aspects on my Master 128. It was fast and accurate. However output presentation is not in graphical form. Astocalc's address is: 67 Peascroft Road, Hemel Hempstead, Herts 8ER. Tel: (0442) 51809.

F Deravi
Swansea

WRONG LETTER

Sir, There was a mistake printed in Paul Tolson's letter. The information on CCD's Utility RAM should have been; 'gives 24k printer buffer and Epson screen dumps, etc.'

There are two versions on the disc, the one for the BBC B (not B+) gives a 12k printer buffer.

Paul F Tolson
West Yorkshire

BRIDGE INFORMATION

Sir, The card playing program *Bridge* is no longer available from Alligata Software.

Do any readers know if it is being produced by any other distributor?

John Constable
Worcestershire

UTILITY SOFTWARE

Sir, In reply to Paul Tolson's letter in the September issue may I say Big F Productions of 29 Pretoria Road, Cambridge, CB4 1HP, produces a range of utility software for use in sideways RAM on the BBC model B and Master 128.

While we are aware of the relative ease of pirating such software we hope to alleviate this by selling our product at very competitive prices and encoding a unique user registration code in each individual program we despatch.

Robert Johnson
Big F,
Cambridge

PAEAN SYSTEMS

For the BBC B, B+ & Master 128 Microcomputers

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Anyone seriously engaged in electronics design needs specific filters sooner or later. ELDESIGN II designs analog active filters in the range Order 0 to 8.
*No calculus *No tables
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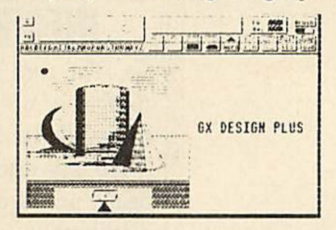
The software comprises Lowpass, Highpass, Bandpass and Bandreject filters. For each filter the five 'classical' approximations are displayed viz. Bessel-curve, Butterworth-curve, Chebychev-curve, Inverse Chebychev-curve and Cauer-curve.

For the filter stages the user may, in most cases, choose from Multiple Feedback, Sallen-Key and Anthoniou circuits. The software provides complete graphical representations of Linear and Logarithmic Gain and Phase graphs, Separate Stage graphs and freely selectable coordinates. Leaflet available on request. Demo disc £5.00 credited against purchase. Screendump routine written for the Star Gemini-10X matrix printer. The software contains a program to adapt the routine for use with other printers. Back-up disc supplied. Suitable for a single sided disc drive.

Price £65.00 fully inclusive.

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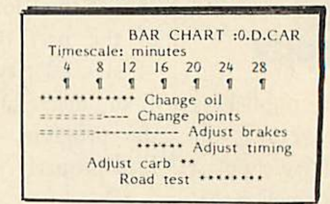
Driven by an analogue joystick, tracker ball or from the keyboard GX Design PLUS offers a competitively priced entry to a high resolution design applications.

*78 icons can be designed by the user on a 27x27 matrix and used as brushes or images and rotated through 90 degrees.
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*64 patterns for infill or background.
*Definition can be enhanced by the erasure of the individual pixels.
*2D images can be transformed to 3D using the isometric functions.
*Mode 0 text can be enlarged to any size.
*Accurate measurements available using the x & y coordinates and a definable grid.
*Display is black on white or the inverse allowing easy hidden line removal for solid or see-through colours.
*7 selectable screen colours.
*Built in Epson screen dump allows any parts of or any number of screens to be successively printed out without breaks. Other dump routine may be used.

Suitable for a single sided disc drive.

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This program uses the PERT principle to organise projects (such as personal, corporate, educational, training projects etc.) in which numerous separate tasks are to be performed with minimum labour requirements at the lowest cost in the shortest time. It gives rapid estimates of costs and timescales, assessment of cashflow requirements, efficient allocation of labour resources and a 'What if' facility to gauge the effect of varying circumstances. The software can handle up to 64 tasks and 26 labour resources over 104 time units making it powerful enough to cover most applications. It contains two demonstration examples: a simple motor car service and a short printed circuit board development project. Each task is given a description, duration and cost. Where one task is dependent on others finishing, this is specified and taken into account by the software. The theory of Critical Path Analysis is applied to create a Bar Chart giving the overall duration of the project, highlighting tasks which are critical to the completion date and showing those where a degree of time float is available. Daisywheel and matrix printer outputs in serial or parallel are provided. Suitable for a single sided disc drive.

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JUNIOR SCRIPT

JUNIOR SCRIPT

Type in text from the keyboard and it will be printed in a typeface which children will easily be able to read or copy. Just like this...

Devised by an experienced Primary teacher Junior Script allows all kinds of worksheets or display labels to be easily printed in the above consistently neat proportionally spaced style. All pieces may be prepared in advance without the need for a printer to be attached and stored on disc for future use or they may be printed out immediately. Four accurate copy lines for handwriting exercises can optionally be added below each line of text or a page of blank copy lines can be printed. A 40 track disc will hold up to 30 titles with a total of 600 lines of text and any number of discs may be set up allowing for example each teacher to have their own disc. Children find Junior Script helpful with reading difficulties as well as writing and also enjoy using the program as a simple word processor. For Canon PW-1080A or Epson FX compatible printers. Suitable for a single sided disc drive.

Price £12.00 fully inclusive.

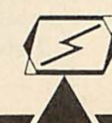
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HINTS & TIPS

Martin Phillips on plotting with the co-ordinate system, and some readers' hints

CO-ORDINATED STRATEGY

'Each of a system of magnitudes used to fix position of point, line or plane' (*The Oxford Pocket Dictionary*)

'Each of a system of two or more magnitudes used to define the position of a point, line, or surface by reference to a fixed system of lines, points etc.' (*Chambers Twentieth Century Dictionary*)

Many vaguely remember co-ordinates from their school days, but when faced with them now, such memories are too distant to be of any real use. What are co-ordinates? The dictionary definitions enlighten little. In very simple terms, co-ordinates are used to tell someone where a particular point is. We can use two co-ordinate systems on the computer; cartesian and polar.

Cartesian co-ordinates are the most well known (and understood). This is the system used by maps and by the PLOT command, and the text and graphics windows. To describe a particular point using cartesian co-ordinates you start at a pre-defined point in a predefined orientation. This point is called the origin. On the computer screen, the graphics origin is at the bottom left hand corner (though it can be changed). You then measure along in a horizontal direction until in line with the point. This direction is often called the X direction. To the right of the origin is positive, to the left negative. Then you measure at right angles to the X axis until the point is reached. This is referred to as the Y direction. If the point is below the X axis then the Y value is negative. If the point is above the X axis then the Y value is positive (figure 1).

If all this sounds confusing, then try listing 1 on page 53, which draws axes on the screen with the origin at the centre as in figure 1. Then using the cursor keys, a red cross on the screen can be moved about with the co-ordinates being displayed on the screen. The numbers displayed relate to the number of steps moved in the X and Y directions.

The origin of the graphics screen on the BBC micro or Electron is at the bottom left hand corner, and is divided up into 1280 steps across the screen and 1024 upwards. It gets tedious always talking about up or across the screen, and the normal jargon used is to call across the screen the X direction and up the screen the Y direction.

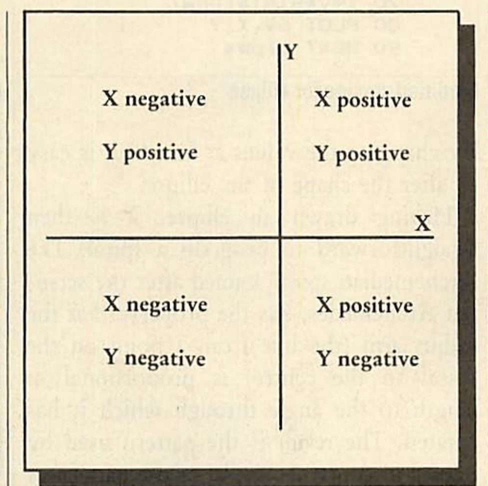


Figure 1. The cartesian quadrants

Figure 2 shows a square drawn using cartesian co-ordinates. To draw this on the screen the following program needs to be used. Note that the X co-ordinate is always given first. The mathematical notation for a point X units along the X and Y up the Y axis is (x,y).

```
10 MODE 4
20 MOVE 300,200: DRAW 700,200
30 DRAW 700,600: DRAW 300,600
40 DRAW 300,200
```

The MOVE statement at line 20 sets the starting point from which the square will be drawn. Instead of using the MOVE and DRAW statements, the PLOT statement could be used. PLOT 4, x, y is the same as MOVE x, y and PLOT 5, x, y is the same as DRAW x, y

```
10 MODE 4
20 PLOT 4,300,200: PLOT 5,700,200
30 PLOT 5,700,600: PLOT 5,300,600
40 PLOT 5,300,200
```

These are the normal ways of drawing on the screen, and the corners are given in absolute terms, that is in relation to the origin of the graphics screen. Sometimes however, it is easier to move relative to the last point plotted. There are some special PLOT statements for this, PLOT 0,x,y moves relative to the last point, and PLOT 1, x, y draws relative to the last point. To draw the square, move to the start point from the absolute origin.

```
10 MODE 4
20 PLOT 4,300,200: PLOT 1,400,0
30 PLOT 1,0,400: PLOT 1,-400,0
40 PLOT 1,0,-400
```

The advantage of this method is that in order to move the square to a different part of the screen it only necessary to alter the PLOT 4 statement.

Polar co-ordinates are less well known than the cartesian system, but are just as easy. Instead of measuring along the X and Y axes to find where the point is, one measures the angle (in radians) and the straight line distance from the origin to the point as in figure 3. For those who are not familiar with radians, 2 x pi radians are the same as 360 degrees (where pi has a value of approximately 3.142).

The equation for a circle on the cartesian

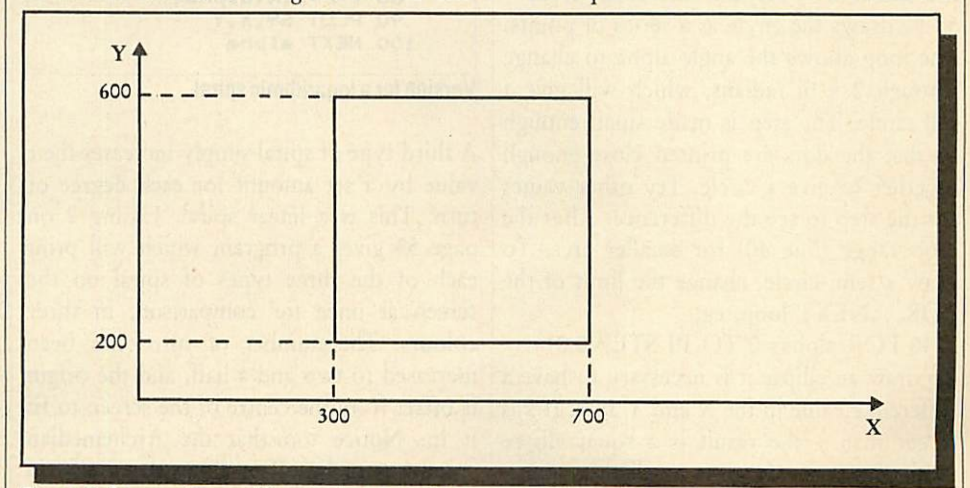


Figure 2. Square drawn with cartesian co-ordinates

system of co-ordinates is simply this:

$x^2 + y^2 = r^2$

where r is the radius. x and y are easy to calculate using trigonometric functions. Consider the right-angle triangle shown in figure 4. The side between the angle α and the right angle is called the adjacent side, and here it corresponds to the X direction. The side opposite the angle α is called, unsurprisingly, the opposite side. The remaining one is called the hypotenuse (which comes from the greek word meaning 'to stretch under'). Then we can define the angles in terms of the lengths of two of the sides.

$$\text{TAN } \alpha = \frac{\text{opposite}}{\text{adjacent}}$$

$$\text{SIN } \alpha = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\text{COS } \alpha = \frac{\text{adjacent}}{\text{hypotenuse}}$$

Thus we can define x and y in the cartesian system in terms of the angle α and the length of the hypotenuse, which in the polar system is the length r.

$x = r \text{ COS } \alpha$

$y = r \text{ SIN } \alpha$

and understanding this it becomes a simple

```
10 REM circle
20 MODE 1
30 VDU29,640;512;
40 r=320
50 FOR alpha=0 TO 2*PI ST
EP 0.01
60 X=r*COS(alpha)
70 Y=r*SIN(alpha)
80 PLOT 69,X,Y
90 NEXT alpha
```

Program for drawing a circle

task to program a circle of radius r.

Line 30 sets the graphics origin to the centre of the screen, point (640,572). This defines the centre of the circle. Line 40 sets the radius to 320, and the loop at lines 50-90 draws the circle as a series of points. The loop allows the angle alpha to change through 2 x pi radians, which will give a full circle. The step is made small enough so that the dots are printed close enough together to give a circle. Try other values for the step to see the difference. Alter the loop range (line 40) for smaller arcs. To draw a semi-circle, change the limit of the FOR. . .NEXT loop, eg,

40 FOR alpha=0 TO PI STEP 0.01

To draw an ellipse it is necessary to have a different r value in the X and Y axes. If x is larger than y the result is a squat ellipse while the converse gives a tall thin shape. The program now becomes:

```
10 REM Ellipse
20 MODE 1
30 VDU29,640;512;
40 x=320:y=200
50 FOR alpha=0 TO 2*PI ST
EP 0.01
60 X=x*COS(alpha)
70 Y=y*SIN(alpha)
80 PLOT 69,X,Y
90 NEXT alpha
```

Modified version for ellipse

By changing the values at line 40 it is easy to alter the shape of the ellipse.

Having drawn an ellipse, it is then straightforward to program a spiral. The Archemedian spiral, named after the scientist Archemedes, has the property that the radius arm (the line from a point on the spiral to the centre) is proportional in length to the angle through which it has rotated. The result is the pattern used by nature to construct shells, or the pattern of seeds in a sunflower head.

```
10 REM Archemedian Spiral
20 MODE 1
30 VDU29,640;512;
40 x=40
50 FOR alpha=0 TO 4*PI ST
EP 0.01
60 r=x*alpha
70 X=r*COS(alpha)
80 Y=r*SIN(alpha)
90 PLOT 69,X,Y
100 NEXT alpha
```

Plotting Archemedes' spiral

Another form of spiral is the logarithmic spiral. Here the logarithm of the ratio of any two radius arms is proportional to the angle between them.

```
10 REM Logarithmic Spiral
20 MODE 1
30 VDU29,640;512;
40 x=40:k=0.2
50 FOR alpha=0 TO 4*PI ST
EP 0.01
60 r=x*EXP(k*alpha)
70 X=r*COS(alpha)
80 Y=r*SIN(alpha)
90 PLOT 69,X,Y
100 NEXT alpha
```

Version for a logarithmic spiral

A third type of spiral simply increases the r value by a set amount for each degree of turn. This is a linear spiral. Listing 2 on page 53 gives a program which will print each of the three types of spiral on the screen at once for comparison, in three colours. The number of turns has been increased to two and a half, and the origin is offset from the centre of the screen to fit it in. Notice too that the Archemedian spiral has to be offset along the x axis to ensure that the origin is in the same place as that of the other two spirals shown.

Graph plotting programs always seem terribly complicated, but once co-ordinates are mastered, the computer can be left to do all the hard work. A particularly useful BBC Basic statement for this purpose is EVAL. This will evaluate a mathematical expression given in terms of a variable X

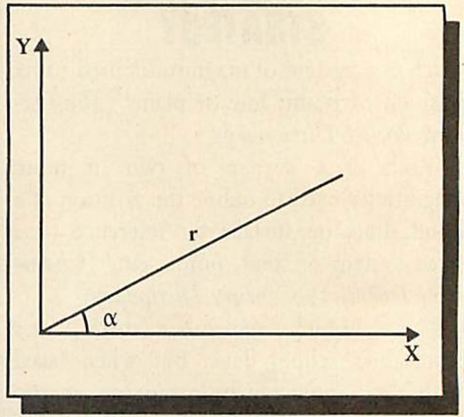


Figure 3. Relating cartesian to polar

(in this case) to give a value which is then used for the Y axis. Most versions of Basic do not have this feature and it is necessary to insert an equation into a program line itself. Equations used with EVAL can include mathematical functions such as SIN, COS, TAN, SQR etc.

Listing 3 on page 53 shows how a simple graph plotting program can be constructed. First the expression is entered into a string called expr$. Then the origin is set to the middle of the screen, and then the axes are drawn. Then X is stepped from −16 to +16, the expression evaluated, and the point plotted. To plot the point, the X and Y range must be adjusted to suit the screen co-ordinates. Hence the x40 multiplier for the X range (40 x 32 = 1280). The Y range will really depend on the expression used. This can be altered to suit certain sorts of graph. To be really clever, you could include a routine to first check the maximum and minimum Y range, and then select the multiplier automatically. By altering the X range, the origin, and the axes, different types of graph to be drawn.

Listing 1 runs like this:

line 70	Select Mode 1 to give 4 colours.
line 100	Draw a cross on the screen. This cross is the positional indicator.
lines 110-190	The main run loop of the program.
line 120	Wait for a key to be pressed.
line 130	'Undraw' the cross.
lines 140-170	Alter the co-ordinates in the

	direction indicated by the key pressed.
line 220	Set the print format variable so that numbers are printed on the screen with no spaces between them.
line 230	Set the graphics origin to the centre of the screen.
line 240	Set the x% and y% variables (used to give the screen co-ordinates) to 0
line 250	Change the function of the cursor keys so that they respond to GET statement.
line 260	Slow down the repeat rate for the keys. This is necessary because the program is a little slow at drawing and undrawing the cross and printing the co-ordinates.
line 270	program function key 0 to reset the key and the normal cursor functions and then list the program. This will be found useful when debugging the program, or if you want to adapt it.
line 300-370	The procedure to draw the axes and label them.
line 390-480	The procedure to draw the cross on the screen and the perpendiculars to the axes. It also prints the co-ordinates.

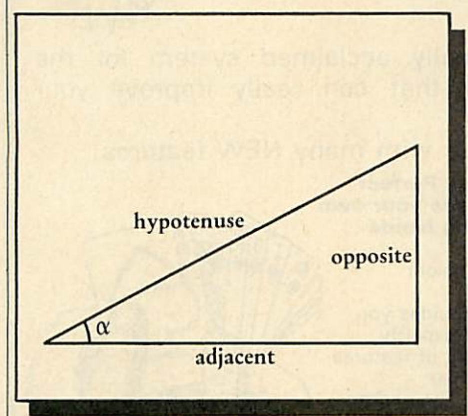


Figure 4. The basis of trigonometry

SEND YOUR OWN HINTS

Just recently there has been quite an upsurge in the number of useful short hints and tips received from readers. They are most welcome, and I will endeavour to print as many as possible. A vast majority of such letters start off by apologising for sending in such a simple idea, or are afraid that many readers will already be aware of the tip. The answer to this is that best hints are the simplest.

Do not worry too much about the style of your programming (most programs received are actually of a very high standard). It is the ideas that are important.

Long programs (longer than about 20 lines) are best sent in on cassette or disc. If a stamped addressed envelope is included these will be returned.

Many readers have asked for some very short programs to be given in Hints and Tips. All contributions gratefully received!

£5 is given for every hint published, and £10 for very good hints.

£5

DATAFILES FROM VIEWSTORE MERGED

George Bright from Southampton has earned himself a fiver by sending in a useful routine for *Viewstore* users (listing 4). It will merge two data files. It works by locating the end of data marker in the main file (CHR$ &01), then adding the file to be merged byte by byte until the new end of data marker is located.

No doubt this technique could also be used to merge files from other databases, once their file structure has been discovered. The easy way to find this out is to create a short file and then dump it to the screen or a printer using *DUMP.

£5

REDUCED DEPTH PRINTING

P W Mercer wins £5 for pointing out a good use for the subscript/superscript print with a reduced line spacing. He has found that if this printer mode is selected, then the printout of the Master Welcome Disc catalogue is small enough to be folded up and placed in the disc sleeve. This particular print will give 14 lines to the inch! To print the ADFS catalogue type

VDU2,1,27,1,83,1,0,1,27,1,65,1,5,3

and Return then

CHAIN "Catall"

and Return, then type 0 or 1 in answer to the 'Which Drive' prompt. Finally press CTRL-B then Return.

The command can be broken down as follows:

VDU2	Enable printer
1,27,1,83,1,0	Enable superscript
1,27,1,65,1,5	Set line spacing to 5/72"
3	Disable printer

£5

DEFINED CHARACTER MASTERPLAN

Some programs do not use the 'legal' way of VDU23 to prepare their set of user-defined characters. They use *LOAD or other means to insert the definitions in the buffer at location &C00. This buffer is in a different place on the Master and Master Compact, and therefore often odd characters are produced instead of the expected ones. Edmundo Herrero from Santa Cruz, Tenerife – where there's a thriving BBC micro user group – wins £5 for his simple but elegant conversion for this problem. His program obtains the necessary information from the buffer after the old program has run. It then sends it to a disc as a spool file ready to be attached to the old program, which should then run correctly. The spooled file (called VDUCODE) will contain the correct VDU23 codes in line numbers starting at 10000. There is no doubt that it is a very neat use of the *SPOOL call. Line 50 might need to be altered, to take into account the starting number of the defined characters. Sometimes these will start at a different number to 224. It could be 128, 126 or 192.

```
 10 REM Spooling VDU23 codes
 20 *SPOOL VDUCODE
 30 PRINT"AUTO 10000"
 40 FOR A%=0 TO 31
 50 AA%=A%+224
 60 PRINT"VDU23,";AA%;
 70 FOR B%=0 TO 7
 80 D%=&C00+A%*8+B%
 90 PRINT",";?D%;
100 NEXT:PRINT:NEXT
110 *SPOOL
```

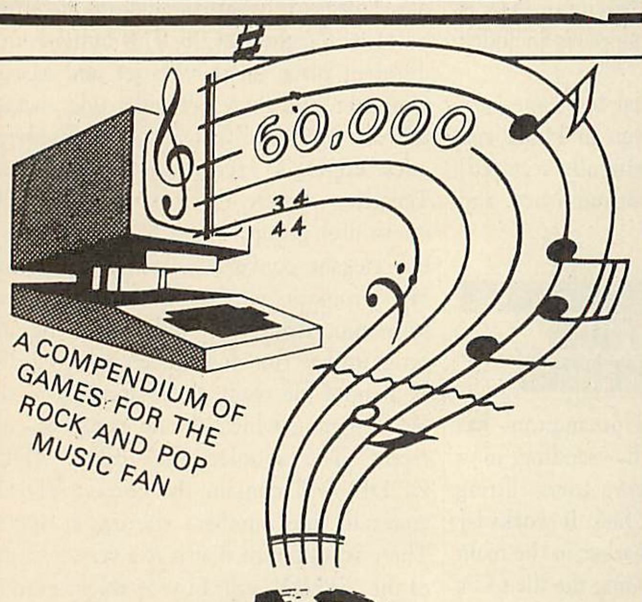
Edmundo Herrero's spooling program

£5

PRINT YOUR OWN GREEK

B V Laniosh from Birmingham earns himself £5 for showing how Greek characters and mathematical symbols can be printed from *Wordwise* +. With the exception of delta, all the symbols are eight dots wide, so they take up the same space as one normal character when printed out. It should be noted that *Wordwise* will not recognise the definitions as characters, and so the justify command will not work correctly. If justification is important, print a pad character, and then issue a OCB embedded command. This is the backspace character, and will move back over the space inserted by the pad character. *Word-*





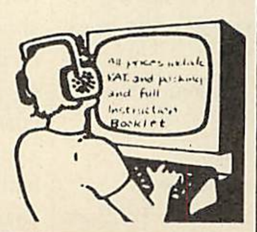
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12. All for User-defined years.

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wise users will have to change the ES command to OC27.

These definitions can also be used within programs. The simplest way is to use *FX3

alpha	α	ES75,8,0,12,18,18,20,14,18,18,0
gamma	σ	ES75,8,0,0,156,98,98,156,0,0,0
lambda	λ	ES75,8,0,194,36,24,8,4,2,2,0
beta	β	ES75,8,0,0,1,127,84,84,84,40,0
omega	Ω	ES75,8,0,2,50,78,64,78,50,2,0
delta	Δ	ES75,11,0,0,6,10,18,34,66,34,18,10,6,0
pi	π	ES75,8,0,0,32,62,32,32,62,34,0
micro	μ	ES75,8,0,1,126,4,4,120,0,0,0
root	√	ES75,8,0,24,12,6,256,128,128,128,128

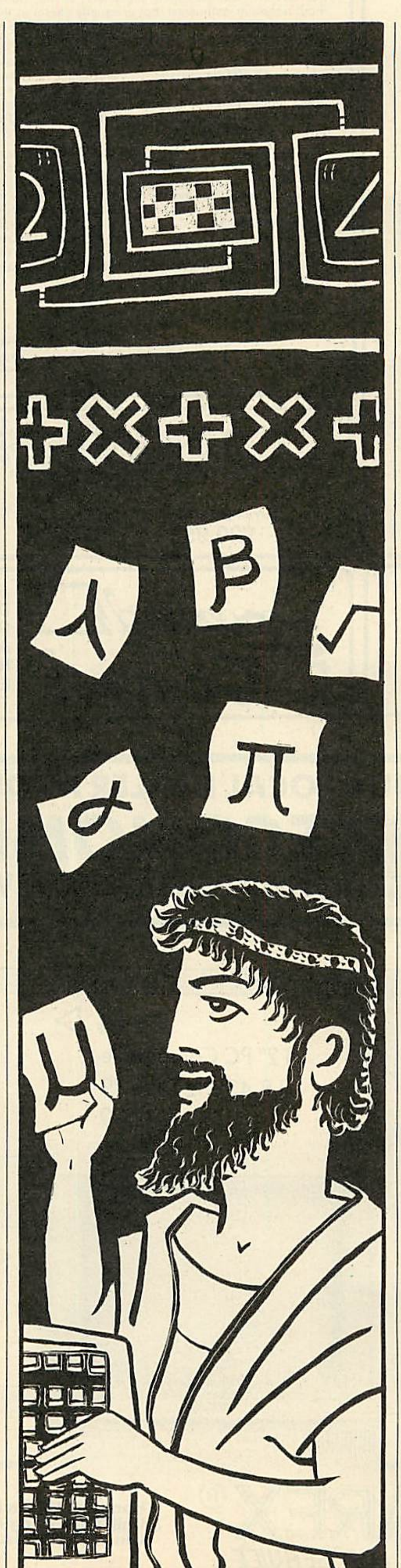
Codes for the Greek characters

to switch just the printer on:

```
10 *FX3,10
20 VDU75,8,0,12,18,18,20,14,18,18,0
30 *FX3
```

```
   10 REM Listing 1
   20 REM Hints & Tips
   30 REM By Martin Phillips
   40 REM For BBC B/B+/M/C/E
   50 REM (c) Acorn User Februa
ry 1987
   60 :
   70 MODE1
   80 PROCinitialise
   90 PROCaxes
  100 PROCcross
  110 REPEAT
  120 A=GET
  130 PROCcross
  140 IF A=136 AND X%>-400 THEN
 X%=X%-40
  150 IF A=137 AND X%<400 THEN
X%=X%+40
  160 IF A=138 AND Y%>-400 THEN
 Y%=Y%-40
  170 IF A=139 AND Y%<400 THEN
Y%=Y%+40
  180 PROCcross
  190 UNTIL 0
  200 :
  210 DEFPROCinitialise
  220 @%=0
  230 VDU29,640;512;
  240 X%=0:Y%=0
  250 *FX4,1
  260 *FX12,30
  270 *KEY0 *FX12|M *FX4|M MO.1
|M |N L.|M
  280 ENDPROC
  290 :
  300 DEFPROCaxes
  310 PRINTTAB(0,15)"-X"TAB(39)
"X"
  320 PRINTTAB(19,0)"Y"
  330 PRINTTAB(18,31)"-Y";
  340 VDU5
  350 MOVE -640,0:DRAW 640,0
  360 MOVE 0,-512:DRAW 0,512
  370 ENDPROC
  380 :
  390 DEFPROCcross
  400 GCOL 3,1
  410 MOVE 0,Y%:PLOT21,X%,Y%
  420 PLOT 21,X%,0
  430 MOVE X%-16,Y%+16:PRINT "x
"
  440 GCOL 3,2
  450 IF Y%<0 THEN y=-48 ELSE y
=48
  460 IF X%<0 THEN x=-148 ELSE
x=16
  470 MOVE X%+x,Y%+y:PRINT X%/4
0","Y%/40
  480 ENDPROC
```

Listing 1



```
   10 REM Listing 2
   20 REM Hints & Tips
   30 REM By Martin Phillips
   40 REM For BBC B/B+/M/C/E
   50 REM (c) Acorn User Februa
ry 1987
   60 :
   70 MODE 1
   80 PRINT "Archemedian"
   90 COLOUR 1
  100 PRINT"Linear"
  110 COLOUR 2
  120 PRINT "Logarithmic"
  130 VDU29,720;480;
  140 x=30:k=0.2:r1=30
  150 FOR alpha =0 TO 5*PI STEP
 0.01
  160 GCOL0,3
  170 r=x*alpha
  180 X=r*COS(alpha)+x
  190 Y=r*SIN(alpha)
  200 PLOT 69,X,Y
  210 GCOL0,2
  220 r=x*EXP(k*alpha)
  230 X=r*COS(alpha)
  240 Y=r*SIN(alpha)
  250 PLOT 69,X,Y
  260 GCOL 0,1
  270 r1=r1+0.2
  280 X=r1*COS(alpha)
  290 Y=r1*SIN(alpha)
  300 PLOT 69,X,Y
  310 NEXT alpha
```

```
   10 REM Listing 3
   20 REM Hints & Tips
   30 REM By Martin Phillips
   40 REM For BBC B/B+/M/C/E
   50 REM (c) Acorn User Februa
ry 1987
   60 :
   70 REPEAT
   80 MODE4
   90 INPUT "Y = ";expr$
  100 VDU29,640;512;
  110 MOVE 0,-512:DRAW 0,512
  120 MOVE -640,0:DRAW 640,0
  130 FOR X=-16 TO 16 STEP 0.02
  140 Y=EVAL(expr$)
  150 PLOT 69,X*40,Y*5
  160 NEXT X
  170 PRINTTAB(13,31)"Press any
 key";
  180 A$=GET$
  190 UNTIL 0
```

```
   10 REM Listing 4
   20 REM Hints & Tips
   30 REM By George Bright
   40 REM For BBC B/B+/M/C/E
   50 REM (c) Acorn User Februa
ry 1987
   60 :
   70 CLS
   80 PRINT "Viewstore Merge Ut
ility"''
   90 INPUT"Main file name ?"ma
infile$
  100 mainfile$="d."+mainfile$
  110 INPUT"File to be merged ?
"mergefile$
  120 mergefile$="d."+mergefile
$
  130 a=OPENUP(mainfile$)
  140 PTR#a=0
  150 REPEAT UNTIL BGET#a=1
  160 b=OPENUP(mergefile$)
  170 PTR#b=0:PTR#a=PTR#a-1
  180 REPEAT
  190 t%=BGET#b:BPUT#a,t%
  200 IF t%=&D THEN PRINT ".";
  210 PTR#b=PTR#b-1
  220 UNTIL BGET#b=1
  230 CLOSE #0
  240 END
```

Listings 2 (top), 3 (centre) and 4

MULTIPROM EPROM PROGRAMMER



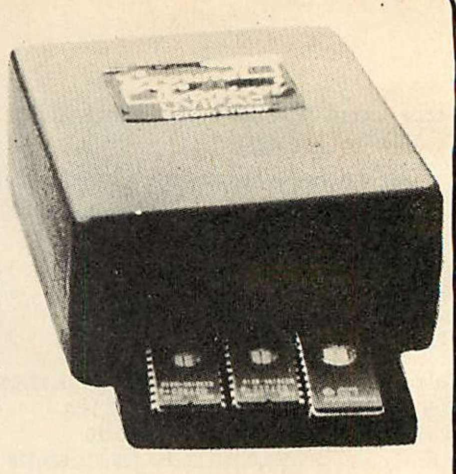
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The necessary UVP 1.1 software, which includes fast programming algorithm, is available on Sideways ROM and contains the following commands:– *TEST (blank check), *READ (afsp) (read Eprom to disc), *BLOW (afsp) (blow EPROM with names file), *VIEW (look at contents of memory from &2000), *COMP (afsp) (compare contents of EPROM to disc). When using *VIEW & *COMP, data is displayed in hex and ASCII format.

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UVIPROM 1 and UVIPROM 2 (with ZIF socket) plug into the user port and can program 2764 or 27128 EPROMs only, using the 1.1 ROM for control purposes, giving 5 *COMMANDS. UVIPROM 32 and UVIPROM 32+ (with ZIF socket) program 27256 EPROMs only, using the 2.1 ROM, with 7 *COMMANDS. Note that the PCBs are not cased and that a disc drive is essential to use the software.

Prices:–

UVIPROM 1 & 32	UVIPROM 2 & 32+	1.1 ROM	2.1 ROM
£20.95	£25.95	£5.00	£8.00

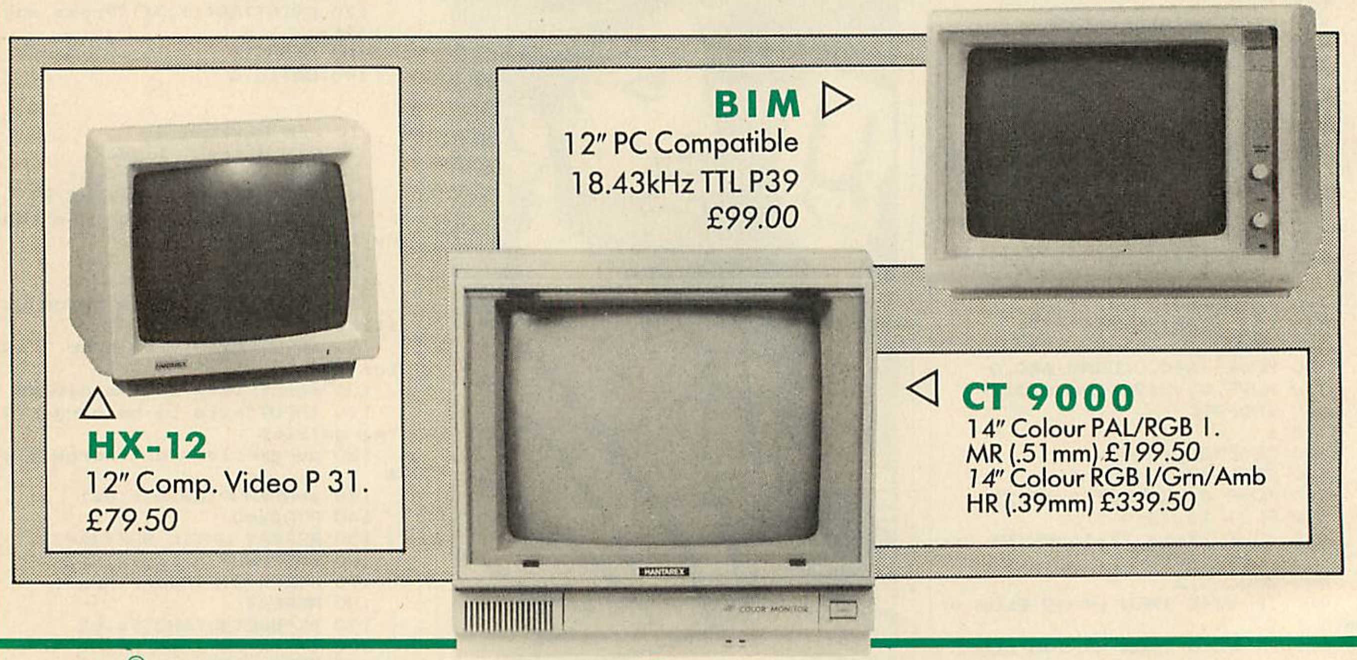
EPROMS Type	1–2	3–9	10+
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FIRST BYTE

FLYING THE FLAGS

This month we continue our series on assembler by looking at special flags and registers

Tessie Revivis

How to control the flow of a machine code program was examined in last month's First Byte, and we now develop the theme further. To refresh memories that may be numb from too much good cheer, we saw that the JMP (Jump) command can be used to pass control to a specific address while the JSR (Jump Save Return) control calls the subroutine at a specified address, while on encountering an RTS (Return from Subroutine) opcode control will return to the line after the JSR. Both of these structures have their direct counterparts in BBC Basic, namely GOTO and GOSUB...RETURN. A much more versatile loop control method is available to us in assembly language – but before we examine it have a close look at listing 1:

Listing 1 is badly written, I know, but it is done in such a way as to allow us to compare it with an assembler program that will produce the same result – print ten asterisks. Let's examine it line by line. First in line 20 a variable is defined and set to zero, and following this in line 30 the variable (X) has one added to its current value. In line 40 an asterisk is printed on the screen. Line 50 is the part of the listing to which we must pay particular attention. It reads as follows: 'If the value of the variable X is not equal to 10 then go to line number 30'. What we have done in effect is to turn the variable X into a flag – in this case it flags the current number of asterisks printed. Listing 2 will produce the same result in assembler:

In listing 2 we are still using X as our flag – this time it is the X register and it is loaded with zero in line 60. Line 70 contains our label and it is in effect the destination of our future GOTO and as such it is labelled as line 30. Line 50 increments the X register by one (INX INcrement X) which is the same as performing x=x+1. Line 90 and 100 print the asterisk. The operation we are interested in begins at line 110 and introduces us to the compare command, which in this case is:

CPX #10

which is read as "compare the X register with the number 10', or more simply, is X equal to 10?

The next instruction, line 120, is another new mnemonic: BNE (Branch if Not Equal), and in this case the label line 30 is the destination of the branch.

Now run the assembly language to see that ten asterisks are indeed printed. The number of asterisks printed can be varied quite simply by changing the value tested for in the CPX instruction. Thus if we wanted our small machine code program to print 55 asterisks then line 110 should be re-typed as:

110 CPX #55

Remember to use the hash symbol to indicate immediate addressing.

Run the original program again and this time have a close look at the listing produced as the machine code assembles. Figure 1 shows how it assembled on my Master – don't worry if the addresses on the left hand side are different on your machine – the relevant sections here are the operands and opcodes which make up the two new lines of code ie, CPX #10 and BNE line30, have been tinted. The first is reasonably straightforward, &E0 is the opcode for CPX and &0A the operand, ie, &0A=10. The opcode for BNE is &D6 but there is only a single byte following the opcodes, &F6, and not a two byte address as you may have thought. In fact branch instructions never use absolute addresses but instead use a branch displacement. The opcode in this case tells the processor to

```
   10 REM Listing 1
   20 X=0
   30 X=X+1
   40 PRINT "*";
   50 IF X<>10 THEN
 GOTO 30
   60 VDU 7
   70 END
```

Listing 1. A badly written program

```
0EE9                .start
0EE9 A2 00              LDX #0
0EEB                .line30
0EEB E8                 INX
0EEC A9 2A              LDA #ASC"*"
0EEE 20 EE FF           JSR &FFEE
0EF1 E0 0A              CPX #10
0EF3 D0 F6              BNE line30
0EF5 A9 07              LDA #7
0EF7 20 EE FF           JSR &FFEE
0EFA 60                 RTS
```

```
0EE9                .start
0EE9 A2 00              LDX #0
0EEB                .line30
0EEB E8                 INX
0EEC A9 2A              LDA #ASC"*"
0EEE 20 EE FF           JSR &FFEE
0EF1 E0 0A              CPX #10
0EF3 D0 F6              BNE line30
0EF5 A9 07              LDA #7
0EF7 20 EE FF           JSR &FFEE
0EFA 60                 RTS
```


Figure 1. Assembly listing produced by listing 2

branch backwards a number of places. Of course branches can also be made in a forward direction so to distinguish the direction of the branch, signed binary is used. This simply means that positive numbers (ie, ones that do not have bit 7 set) which are in the range of zero to 127 (0000 0000 to 0111 1111) tell the processor to branch forward, whereas negative numbers (ie, those with their top bit set) which are in the range 128 to 255 (1000 0000 to 1111 1111) mean a branch backwards. So in effect the displacement byte is either added to or subtracted from the program counter to give the address from which the processor will continue executing.

As the assembler in BBC Basic is rather

```
      10 REM Listing 2
      20 DIM code% 50
      30 FOR pass=0 TO
   3 STEP 3
      40 P%=code%
      50 [.start
      60 LDX #0
      70 .line30
      80 INX
      90 LDA #ASC"*"
     100 JSR &FFEE
     110 CPX #10
     120 BNE line30
     130 LDA #7
     140 JSR &FFEE
     150 RTS
     160 ]
     170 NEXT
     180 CALL start
```

Listing 2. The same result from assembler

clever we do not have to work out the branch displacements, it will do it for us. However, it is useful to have a knowledge of how the displacement is calculated. To calculate a branch backwards we must first count the number of bytes we are going to jump over. As the program counter will be pointing to the instruction after the BNE line, it is necessary to include these in our count back. Using figure 1, the number of bytes to branch over are 10 (&0A). All that now remains for us to do is to calculate what is known as the value's twos complement. To do this we must first write down the number of bytes in binary:

&0A = 0000 1010

and then we invert or flip all the bits to obtain what is called the ones complement value. This is done by changing all the zeros into ones and similarly all the ones into zeros thus:

&0A = 0000 1010

one's complement = 1111 0101

And finally the two's complement is obtained by adding one to the one's complement thus:

one's complement = 1111 0101
1
two's complement = 1111 0110

and in hexadecimal this is, yes, &F6!

Because the displacement is a relative value, this type of addressing mode is called relative addressing. Since all branches are two bytes long, the effective displacement in a forward direction is 129 bytes (127+2) and in a backwards direction is −126 bytes (−128+2).

Listing 2 used a counter to count up from zero to 10 – this is perfectly acceptable, but when we wish purely to count out a number of actions it is much more effective to count down, in this case from 10 as we can get rid of the CMP instruction and thus save two bytes of code – not a lot in our humble terms but when writing large machine code programs this sort of saving can add up to a saving in program execution time, thereby making your program quicker, as well as saving space. Listing 3 shows the new re-written program.

In listing 3 the X register is first loaded with the number of iterations, or repeated applications of the same routine, we require the loop to perform. Our loop control mechanism (INX in listing 2) has now become a DEX (DEcrement X, ie x=x−1) instruction and has moved to the end of the program (line 100). The BNE instruction follows directly on from this (line 110). We have done away with the CMP instruction. We could have included a line as follows:

105 CMP #0

However, there is no need to because a special facility is built into the microprocessor, such that whenever an operation results in a register being loaded with zero a special 'zero' flag will be set to signify this fact. It is this zero flag that defines how the BNE will operate. If the zero flag is set then the BNE will not take place and the instruction after it will be executed. If on the other hand the result is non-zero, then the zero flag will remain unset and then BNE instruction will be executed.

The zero flag is one of several special flags which define how various branch instructions will work. These flags as they are called are held in a special register called the status register which will be the subject of the next First Byte.

```
      10 REM Listing 3
      20 DIM code% 50
      30 FOR pass=0 TO
   3 STEP 3
      40 P%=code%
      50 [.start
      60 LDX #10
      70 .line30
      80 LDA #ASC"*"
      90 JSR &FFEE
     100 DEX
     110 BNE line30
     120 LDA #7
     130 JSR &FFEE
     140 RTS
     150 ]
     160 NEXT
     170 CALL start
```

Listing 3. The re-written program

JARGON

Accumulator: The main register of the microprocessor memory.

Assembler: A special part of the BBC Basic ROM chip which converts assembly language programs into machine code which can then be executed.

Branch: Transferring program control to another point in a machine code program.

Displacement: Number of bytes forward or backward where a program branches.

Flag: A location which will contain a value which signifies information.

Label: An alphanumeric name preceeded by a full stop which is used to mark a particular point in a program.

Mnemonic: The shorthand way of writing assembly instructions. For example, LDA is the mnemonic for 'load accumulator'.

Object code: The machine code generated by the assembly language source code.

Opcode: The number which represents the machine code instruction.

Operand: The information which follows the opcode. Thus, in the instruction LDA#5, 5 is the operand.

Source Code: A name given to the assembly language program which will generate the machine code. The source code is composed of mnemonics.

Subroutine: A segement of program that may be required many times by the main program. Rather than include the segment of program at every point it is taken out and placed ideally at the end of the program. It is labelled with a name and each time it is required, a subroutine call can be made with the JSR instruction. All subroutines must end with an RTS instruction.

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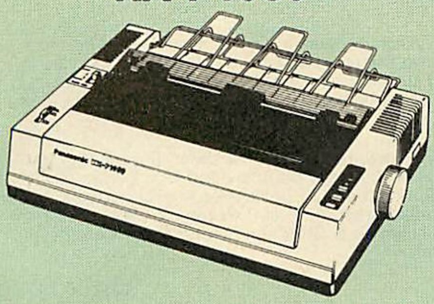
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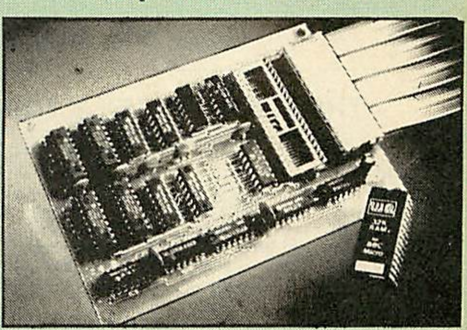
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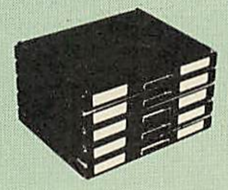
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£4



STAK-PAK

The unique computer program filing and storage system. Made of tough black plastic, these compact drawer sections hold two cassettes each and lock together vertically to form miniature cabinets of any height. Each drawer section has two C12 Data Cassettes with labels plus external index card.

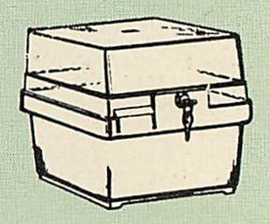
Five twin Packs incl.
10 Cassettes Only: **£5**

FLOPPY HEAD CLEANER KIT

The heads in floppy drives are precision made and very sensitive to dirt. The use of a cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. It is very simple to use.

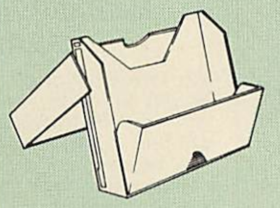
£8

LOCKABLE DISC STORAGE UNITS



Strong plastic case that affords real protection to your discs. The smoked top locks down. Dividers and adhesive title strips are supplied for efficient filing of discs.

- M35 - holds upto 50 discs **£8**
- M85 – holds upto 95 discs **£10**



PLASTIC LIBRARY CASES

FOR 5¼" DISC STORAGE holds 10 Discs. **£2.00**

DUST COVERS (For our Disc Drives)

Single CLS (without PSU) ***£3.20*** Twin CLD (without PSU) **£3.85**
Single CS (with PSU) **£3.95** Twin CD (with PSU) **£3.90**

Quality Disc Drives from Watford

To help you decide which drive is the most suitable for your needs (and your pocket!), we have produced the table below.

The first capacity given in the first column indicates capacity in single density mode. That within the brackets is the capacity in double density mode. All disc drive type numbers start with the prefix "C".

The tinting on some of the boxes is used to indicate which Drives are 40 track (non-tinted) and which are 80 track (tinted). All our drives are of Japanese manufacture. All our 80 track drives are already fitted with a 40-80 select switch.

***All our Disc Drives are Double Sided and will operate in both Single and Double Density modes.** Extensive experience of the usage of disc drives suggests that the JAPANESE drives currently represent about the best in terms of speed, reliability and overall "elegance" available for the BBC Micro.*

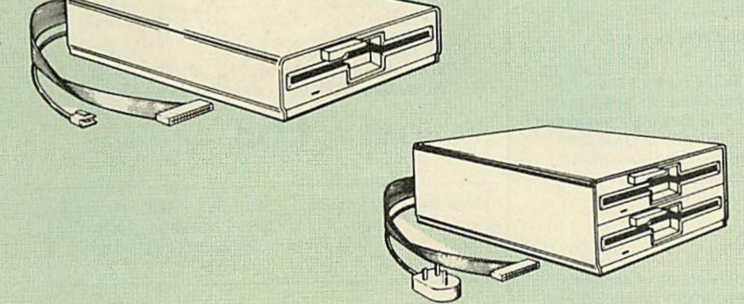
Various other "manufacturers" of disc drives for the BBC micro (more accurately, "packages" label other manufacturers drives with their own name). We buy the high quality JVC and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public.

If you look around the popular BBC micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, some of the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.

Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate (extensive tests within our workshops have confirmed this). All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. Ideal for Schools & Colleges. We are now able to supply all single disc drives with Power Supply, in either single or dual case. (Dual case has a twin data cable and a power supply capable of driving two disc drives) allows easy expansion to a dual drive unit, at a later date. Prices stated in the pricing boxes below for single drives is for a single drive in a standard single case. Single drive in a dual case cost an extra £5. (At Watford we anticipate your needs of tomorrow, not just today)!

When using a BBC Micro, most people find themselves short of desk space. The Watford's BBC Micro plinths form an ideal way of recovering some of this precious space) your BBC, Disc Drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. With the Watford Double plinth, your Disc Drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen, paper, reference manuals, etc. Follow the trend with Watford plinth. *(Turn to the 10th page of our advert for the Plinths).*
P.S. All our 5¼" Disc Drives are compatible with the Compact Micro. All you require is the special Compact Disc Drive Cables designed by us.

COMPACT DISC DRIVE CABLE
Single £9 Twin £12



Capacity	Drives without P.S.U.		Drives with P.S.U.	
	Single	Twin	Single	Twin
200K (360K)	CLS 200 £95		CS 200 £108	
400K (720K)	CLS400S £96	CLD 400 £180	CS 400S £109	CD400 £200
800K (1.44M)		CLD 800S £183		CD 800S £204

● TWIN Disc Drive Case, complete with Power Supply & Cables **£43**
Securicor carriage on Disc Drives £5 to £6

*Prefix **C** = Cased Drive*
***L** = Less PSU*
***S** = Single*
***D** = Double*

*Suffix **S** = 40-80 Switchable*

e.g. CLS400S = Cased drive, Less power supply unit, Single 400K, Switchable (40-80 track).

3M – DISKETTES

Top quality 3M – SCOTCH Diskettes from Watford Electronics (Your 3M Appointed Distributors). All our discs carry a lifetime warranty. These discs are quiet in operation and insert positively with their reinforced hub rings. Boxes of 10 supplied complete with self stick disc labels and write protect tabs.

- *10 × 5¼" S/S D/D 40 Track Diskettes* ***£10***
- *10 × 5¼" D/S D/D 40 Track Diskettes* ***£12***
- *10 × 5¼" S/S D/D 80 Track Diskettes* ***£15***
- *10 × 5¼" D/S D/D 80 Track Diskettes* ***£15***
- *Hi-Density 10 × 5¼" 1.6M D/S D/D for IBM* ***£32***
- *10 × 3½" S/S D/D 40/80 track Discs* ***£20***
- *10 × 3½" D/D D/D 40/80 track Discs* ***£24***

TOP QUALITY 3½" & 5¼" DISKETTES

To complement the range of quality discs and disc drives that WE already sell, WE are now supplying some special offer packs of 10 high quality discs. Each Disc has a reinforced hub ring and carries a lifetime guarantee. These are supplied complete with selfstick labels and packaged in an attractive plastic library disc box to protect them from damage. We strongly recommend these Discs.

DON'T SETTLE FOR LESS, BUY THE BEST

- *10 × **M3** 3½" D/S D/D 80 Track Discs* ***£20***
- *10 × **M4** 5¼" S/S D/D 40 Track Discs* ***£9***
- *10 × **M5** 5¼" D/S D/D 40 Track Discs* ***£11***
- *10 × **M7** 5¼" D/S D/D 80 Track Discs* ***£14***
- *3" Double Sided Discs* ***£3** each*

Special BULK OFFER on 5¼" DISCS

(Supplied packed in plastic storage Units)
(Lifetime warranty on Discs)

BULK PACK DISCS in lots of 100

Type	S-S 80T	D-S 80T
● Without Sleeves	£49	£74
● With Sleeves	£50	£75

ACORN WINCHESTER DRIVES

Suitable for direct connection, via the 1MHz bus, to any BBC running ADFS. These Acorn Winchester disc drives are fast and extremely reliable. Each Winchester comes complete with the Level III Econet File Server software.

10 Megabytes **£1050; 30 Megabytes £1549**

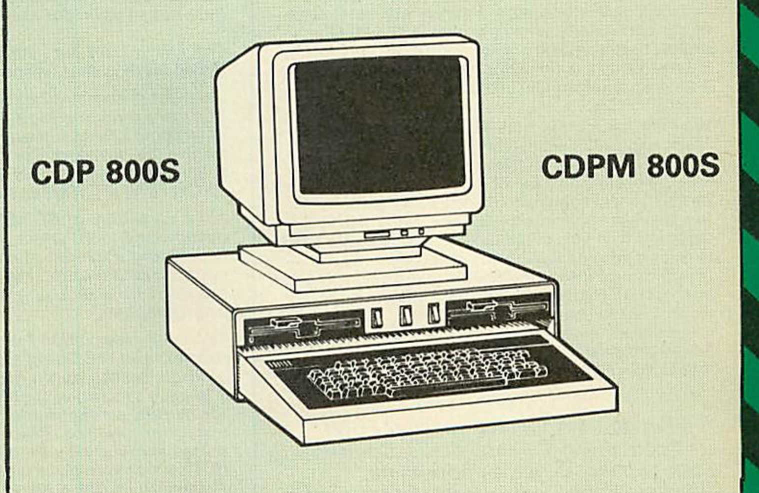
WATFORD's WINCHESTER DRIVES

- 20 Megabytes with ADFS **£635**
- 40 Megabytes with ADFS **£999**

WINCHESTER WORKSTATION

20 Megabyte Winchester, plus a Tape Streamer and a 400K Floppy Drive all housed in a plinth with cooling fan **£1499**

CDP 800S **CDPM 800S**



Twin 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC Micro. Supplied complete with integral power supply, cables and Utilities disc. The switches are mounted on the front panel for ease of use.

CDP 800S for BBC Micro £210
CDPM 800S for Master £225
(Securicor Carr. £7)



Harness the full potentials of your Epson RX & FX Printers. Impress your friends and business colleagues with the quality of your letters and printed material with Watford's very simple to use EPSON NLQ! (Near Letter Quality) ROM. Suitable for FX80, RX80, RX80F/T, FX100.

Look at the features:

- Simply type *NLQ80-100 and a single VDU code to use NLQ print.
- NLQ is then available without any modifications from BASIC, WORDWISE, VIEW (with NLQ DRIVER) or virtually any other program or language.
- Single codes select PROPORTIONAL type (yes even on the RX80) ENLARGED type; UNDERLINED type. These features can be used seperately or in any combination.
- Full UK character set) Standard 'pica size') Proportional spacing; Enlarged; Underlined; Normal type.

The NLQ ROM is supplied complete with comprehensive manual.

P.S. NLQ ROM is compatible with the Torch Z80 system and can be used from within the Perfect Writer software.

Only: £25

VIEW PRINTER DRIVER for NLQ ROM

This specially written printer driver has been designed to allow View access to the full features of our NLQ ROM.
A must for all VIEW and NLQ ROM users.

£7.00

(Hi-View compatible)

THE NLQ DESIGNER

(The First & still the Best)

KAGA KP810-910 and Canon PW1080 are two superb printers, as our many thousands of satisfied customers would surely attest to. One of it's particularly strong points is the NLQ option that it offers; perhaps one of the more weaker points is the effort required to design your own custom NLQ font.

Well the solution is here NOW in the shape of Watford's NLQ DESIGNER ROM! For the BBC Micro. This powerful piece of software allows easy design and entry of a full NLQ font, with further fonts recallable from disc. Once a font has been programmed with the versatile NLQ DESIGNER, it can be saved to disc, downloaded to your Kaga (or Canon) printer, or even programmed into an EPROM (given the appropriate hardware) and then plugged directly into your printer so that it is available immediately when you turn it on. Downloadable Fonts require 6264 RAM chip fitted. Now BBC Master compatible.

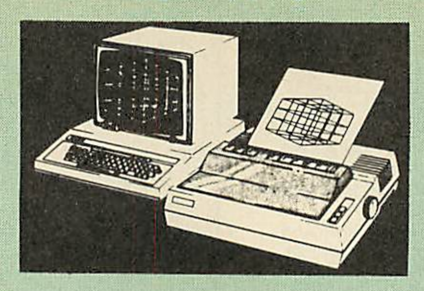
A 40 or 80 track (please specify) FONT Disc containing 9 Fonts, (Italic, Courier, Courier Italic, Script, Copper Plate, Shadow, Bold, Double Print, Gothic and Greek is now supplied FREE with every package.

(P.S. This ROM is not suitable for Epson printers.)

- NLQ Designer ROM & FONT Disc **£25**
- Kaga Individual FONT ROMs **£15**

(Write in for further details).

DUMPOUT 3



A highly sophisticated screen dump ROM. This has to be the most flexible and powerful screen dump ROM yet produced for the BBC micro. It will put on paper anything you see on the screen, including all Mode 7 facilities etc. We have to admit that there is one facility that we cannot replicate – if anyone can supply flashing ink we would like to know!
The ROM also provides window setting utilities and two new OSWORD calls that allow mode 7 graphics pixels to be read and plotted using the standard graphic co-ordinate system. The latest version includes a graphic dump trigger for dumping screens from games whilst they are running.
Two commands are used to operate the dump routines(
*GIMAGE – This provides a full graphics dump of any graphics mode, plus modes 7 and '8'. There are many optional parameters but you need only specify the parameters you wish to change.

Features available include:

- Vertical and horizontal scaling through all the graphic modes and mode 7
- Rotation of the image produced through 90, 180 and 270 degrees
- Left hand indentation setting
- Screen dump window definition
- Colour grey scaling
- Two tone fast dump
- Special colour mask
- Mode 7 contrast expansion
- Mode 7 contiguous dump
- Key triggered dumps
- User port switched dumps

What does the independent press say!

Practical Electronics, May 1985
"The Dump Out 3 ROM from Watford Electronics represents one of the most sophisticated types of printer dump utilities available for the BBC Micro . . .".

"an extremely sophisticated and powerful dump utility".

"VERDICT – Dump Out 3 ROM has all the facilities which you are ever likely to need for producing printer dumps. The facilities available work extremely well and if printer dumps are something which you require, then this ROM can be recommended to help you to get the best out of your dot matrix printer".

The Micro User Feb. 1985.
"Well, here is that winner"!

"provides) some rather sophisticated screen dumps. Producing high resolution paper copies of graphic screens in any (graphics) mode will be the major reason for buying this ROM, and this is where Dump Out 3 performs PAR EXCELLENCE". (Our capitals for their italics.)

"The versatility of ßGIMAGE (the graphics dump command) when using these parameters is amazing. Pictures of almost any size, shape, contrast or distortion may be produced without the need for a reducing photocopier or trick photography".

"Without reservation I wholeheartedly recommend the Dump Out 3 ROM as the ultimate screen dump facility for the BBC micro. It is easy to use yet highly versatile, and caters for all BBC screen modes in multitone high resolution printing. Whole, partial, rotated and scaled screens may be dumped to almost any BBC compatible dot matrix printer (see our list at the end of this advert). At £25 it must represent excellent value for money and surely cannot be beaten".

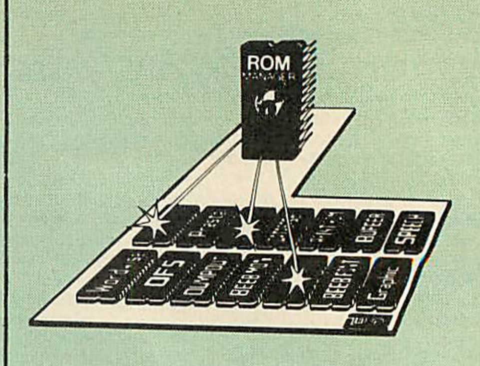
Designed for use with the following printers:

GLP, GP80/100/250, CANNON, STAR, KAGA/ TAXAN, NEC, SHINWA CP80, GEMINI, EPSON MX/RX/FX, M1009, NEC PC8023, DMP100/200/ 400, Panasonic KX1080, Mannesman Tally etc.

Price including comprehensive manual

£25

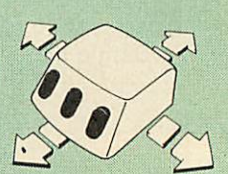
ROM MANAGER



Probably the most powerful way of expanding the BBC micro is from the use of Sideways ROMs. One problem faced by the avid ROM collector is that of ROM command clashes. The solution is very simple in the form of the ROM that "Provides comprehensive management of all your installed ROMs". (Quote from BEEBUG November '84.)
Basically, ROM Manager offers you the ability to turn off any installed ROM, or to send any * command to any specific installed ROM. It is said that imitation is the sincerest form of flattery – Acorn's BBC Plus features many of the abilities of this powerful ROM.
Many more facilities available.

SPECIAL OFFER £20

THE AMX MOUSE



Now supplied with the NEW SUPERART Software ROM & Disc at no extra cost.

ONLY: £63 (carr £1.50)

We are giving away, absolutely **FREE**, our popular Colour Art software package worth **£15** with every AMX Mouse package purchased from us.

AMX DESK Package	£19.00
AMX UTILITY Package	£11.00
AMX SUPERART Package	£42
AMX PAGE-MAKER Pack Best desk-top publishing software. Works with keyboard, joystick and AMX Mouse	£34
AMX 3D ZICON Disc	£19
AMX Database Disc	£19
AMX XAM Educational	£19
AMX MAX(A gem of desktop (ROM)	£17

RB2 MARCONI TRACKER BALL

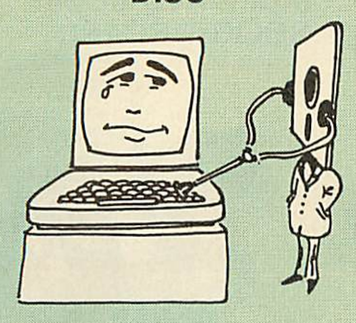
This popular unit is supplied complete with software.

Price: **£50**

FLEET STREET EDITOR

Software pack **£35**

DIAGNOSTICS DISC



The BBC micro is a very complex machine and thus diagnosing a fault can be very difficult. Until now, the only way to discover the nature of a fault was either to find a competent friend with a large degree of patience or to find your nearest dealer and pay him to find out what is wrong.
At Watford Electronics, we realise how difficult it can be when faced with a problem, finding yourself a long way from your nearest dealer, or even just uncertain about your Beeb's health, but not wanting to waste time and money taking it to be looked at.
The solution to these problems is here now, in the form of the Watford's Diagnostics Disc. This excellent utility is specially designed to test out the following areas of your Beeb:
RAMs, ROMs, ULAs, Sound, Keyboard, Disc, RS423, ADC, User Port, Printer Port, Cassette, Joysticks, Speech, Disc Drives, 6502 and Z80 2nd Processors.
This utility is an invaluable aid for all those who take the reliability of their system seriously. A comprehensive manual provides full operating details and a list of possible causes and remedies for any faults that you may find along the way. The package also enables a permanent equipment and service record to be maintained.

Only £20.00

BBC Publication's Popular Educational Software

- Maths with a Story 1 (Cassette). 4 primary level maths programs **£10.95**
- Maths with a Story 2 (Cassette) 4 further maths programs **£10.95**
- Picture Craft (Disc) 6 - 14 age group. Pack consists of flexible geometrical design & colouring programs **£19.95**
- WAVES: Science Topics (Disc) CSC O Level Physics program. **£14.95**
- RELATIONSHIP: Science (Disc) O Level Biology program. **£14.95**
- BONDING: Science (Disc) O Level Chemistry program. **£14.95**
- ELECTROMAGNETIC SPECTRUM (8 Discs) O Level program. **£14.95**
- ELECTRONICS IN ACTION (Disc) O Level program **£14.95**
- NEWTON & THE SPACE SHUTTLE (Disc) O Level program. **£20**
- ECOLOGY (Disc) O Level program. **£20**
- POLYMERS (Disc) O Level program. **£20**
- Clasification & Periodic Table O Level. The suite is supplied with its own database of chemical elements which can be classified according to your own rule. **£20**
- FOOD & POPULATION (Disc) O Level program. **£20**
- MICROTECHNOLOGY (Cassette) O Level program. **£6.95**
- A VOUS LA FRANCE (2 Cassettes) A French language home study aid. **£17**
- DEUTSCH DIREKT! (Disc & Audio Cassette) **£20**

TED

The Teletext Editor Package for serious users

TED is the brand new package from Watford Electronics for the editing and creation of teletext (Mode 7) screens and displays. TED is ideal for anyone wanting to create their own Mode 7 pictures (such as game title pages), designing animated displays for shop windows, exhibitions, classrooms, etc. TED is also probably the most powerful Prestel screen editor you will ever come across.
Supplied on a special 32k package, full facilities are providing for manipulating the screen, including easy to use pixel manipulation; line, column and block buffering and copying; left and right margins; large text in a variety of different fonts (contained within the ROM device); various borders and effects templates (contained within the ROM device); line and column insertion and deletion; easy to use graphics line drawing. Those are some of the features of editor itself. In addition to this, TED contains routines for taking a number of Teletext screens and creating them into an animated sequence, with user selectable display times, repeats on a group of shows, various entry methods (how the picture is put onto the screen), routing selection (both predefined and keyboard specific), chaining of other shows, etc. Scrolls treat the Teletext sequence as a very long page with a window onto it. Supplied complete with a comprehensive manual. There are many more facilities not mentioned here, so write in for a comprehensive leaflet; you'll wonder how you managed without TED.

Price: £35

ROM-SPELL

"way ahead of any competition"



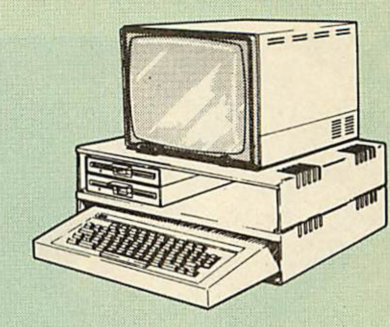
ROM-SPELL is probably THE most advanced and fastest spelling checker available for the BBC Micro. Printed below are some extracts from a recent independent review (A&B Computing Nov. '85), which we feel sure will convince you that this is THE only spelling checker worth considering.
"The editing system is very neat and simple, instead of replying to queries and beeps all of the time . . ."
"The other feature which places ROM-SPELL way in front of any competition is the ability to examine the user dictionary, so any spelling mistakes that have found themselves on the disc can be examined and taken out if necessary".
". . . that it is compatible with many of the popular word processors on the market is a good indication that ROM-SPELL is going to be a very popular product indeed".
". . . ROM-SPELL is by far the best spelling checker for the unexpanded BBC B (with or without word processor). It boasts features which are hard to find on conventional spellcheckers on CP-M and MSDOS, namely Spellstar and has a speed-performance ratio of roughly the same as its CP/M cousin. The difference is that the CP/M version would cost the best part of £500".
". . . and with such vital house keeping features as an ambiguous word checker, the ability to edit the user dictionary, a comprehensive manual that is both easy to read and actually ENJOYABLE to learn from, . . . I feel confident that ROM-SPELL will woo the word processing public with no problems at all".
Compatible with: View, Wordwise & Wordwise +.

Don't settle for less, Buy the best.

£25

(Not compatible with 1770 DFS)
(Please state 40 or 80 track disc)

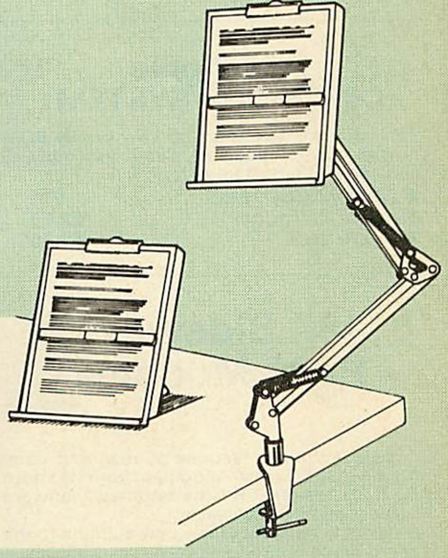
PLINTHS FOR BBC MICRO, MASTER & PRINTERS



Protect your computer from the weight and heat of your monitor. The BBC micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and monitor, whilst the double height version provides enough room for our stacked or side-by-side dual disc drives or TORCH Disc pack, to be placed in the centre section. If you use our stacked drives, the remaining space can be used for further peripherals e.g. Speech Synthesizer, EPROM programmer or simply stationery. The computer slides neatly in to the lower section allowing easy access to remove the lid. The printer plinth is equally sturdy but without the cooling slots. It allows for access to the paper from the front as well as from the rear, (a facility not often thought of in similar products) if the paper is located beneath the plinth. This is a very convenient way to work especially if your work area is not deep enough to take the printer and paper separately.

SINGLE BBC PLINTH	**£11** (carr. £1.50)
DOUBLE BBC PLINTH	**£20** (carr. £2.00)
PRINTER PLINTH	**£10** (carr. £1.50)
SINGLE MASTER PLINTH	**£14** (carr £1.50)
DOUBLE MASTER PLINTH	**£25** (carr £2.00)

COPY HOLDERS



How often have you been about to type hand written notes into your computer when you find that there's nowhere to rest the paper or that your notes are resting at the wrong angle to read the type? Whether the notes be your latest program or the draft of a new trilogy, the new Manuscript Holders from Watford are superb for holding your paper at the ideal height and angle to allow you read and type in ease and comfort.
Available in 2 versions, desk resting and shelf clamping versions, these two units hold your paper firmly by means of a magnetic rul er and a clip grip.

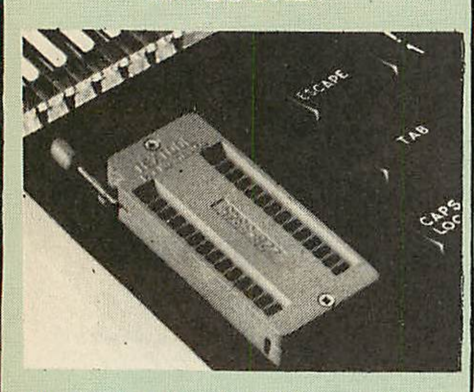
Amazing value at only
Desk Top **£10** (carr. £2)
Angle poise **£14** (carr. £3)

All prices in this advert are exclusive of VAT.

Continued



SIDEWAYS ZIF SOCKET



Allows you to change your ROMs quickly and efficiently, without opening the lid. The ZERO INSERTION FORCE (ZIF) socket is located into the ROM Cartridge's position.

- Very simple to install. NO SOLDERING required. The ZIF (Zero Insertion Force) eliminates the possibility of damage to your ROM pins when inserting & extracting.
- The low profile of the socket allows unrestricted access to the Keyboard.
- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.
- This versatile hardware solves the problem of running out of socket space. Simply lift the ROM from the ZIF & insert a different one (No pulling or pushing of Cartridges. It is a must for all professionals and Hobbyists alike.)
- BBC, B+ and Master compatible.

ONLY **£15** (carr £2)

Low Profile CARTRIDGE SYSTEM

Complete System consists of: Low profile ROM Cartridge, Socket housing, Cable assembly, 5 labels and a library storage rack.

- Complete System **£11**
- Spare Cartridges **£2.50**
- Spare Rack **£1.50**

16K Sideways RAM Modules

Complete with such features as read and write protection, these new modules from Watford Electronics are ideal for the hobbyist, software developer and ROM collector.
Key points to note about this new addition tc the Watford range of products are(

- Write protection (useful in a variety of circumstances).
- Read protection (allows recovery from ROM crashes).
- Compact construction.
- May be fitted in systems even with a ROM board.
- Multiple units may be fitted, even with a ROM board.
- No overheating or overloading problems.
- Free utilities disc supplied.
- Can be used as a 16K PRINTER BUFFER.
- Ideal for professional software development.
- Supplied with utilities software disc.

Only: **£29** (carr £2)

Optional extras

READ and WRITE protect Switches **£2** each
Battery for Battery Backup **£3**

16K DISC RAM

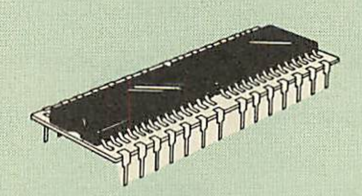
Unlike other RAM boards, this revolutionary, battery backed up, write protectable 16K sideways RAM board allows you to run from disc every sideways ROM available.
Features available are:

- No soldering or modifications to BBC micro necessary.
- Plugs into normal ROM socket fitting neatly under the keyboard allowing room for other add-ons.
- Easy to use. Comes with disk based software to SAVE and LOAD ROMs. Allows you to make backup copies of your ROMs.
- Disk software can be copied onto other discs when disc is full.
- No messy plugging and unplugging of your ROMs. Simply Load the one you want into DISC RAM.
- Ideal for Professional users to develop ROMs. Backup facility allows testing of final versions without using EPROMs.
- The switch provided allows backup and write protection to be switched off externally.
- Can also be used as 16K printer buffer RAM in conjunction with our Buffer & Backup ROM.

New Low Price: £32 (carr £2)

P.S. 16K DISC RAM Board is not designed to work in conjunction with a Sideways ROM Board.

SOLID STATE 16K SIDEWAYS RAM



This new unit from Watford, which utilises the latest in Static RAM technology, offers 16k of easy-fit sideways RAM in a very compact unit with a footprint no larger than a standard 28pin EPROM. With only a single flying lead terminating in a mini hook-on probe, to fit, (no soldering required) this compact unit works with any BBC Micro with or without a ROM board. ***Compatible with BBC B Plus.*** Like our other 16K RAM Modules, this unit is very simple to fit.

Only **£28** (carr 2)

Supplied complete with comprehensive software on Disc, Operating and fitting instructions.

Do you find the 16K Sideways RAM Units confusing? If so, we have compiled this quick questionnaire to help YOU decide which is the best one for you. If the answer to any of the questions is yes, then use the index number to selèct from the boards below. Options in brackets indicate possible secondary choices.
Do you require:

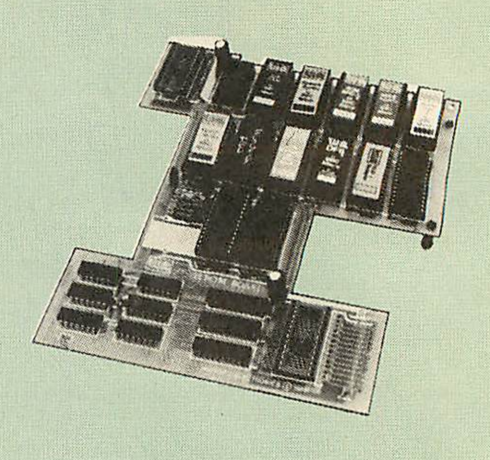
- Sideways RAM for a BBC B+ Choose 1, 2 or 3.
- Sideways RAM for the B+? Choose 3.
- A small, basic module? Choose 3.
- A sideways RAM module for a ROM board? Choose 1 or 3.
- An easy to use utilities disc[Choose 1, 2 or 3.
- More than one module installed at once? Choose 1 or 3.
- To use sideways RAM as a printer buffer? Choose 1 or 3.
- Battery Backup? Choose (1) or 2.
- Write protect for RAM (makes ROM look like RAM)? Choose (1) or 2.
- Read protect (allows recovery from crashes)? Choose 1.

Key:
1) 16k Sideways RAM Module
2) 16k Disc RAM
3) Solid State 16k Sideways RAM

GRAPH PAD 2

Supplied complete with Software
£60 (Carr. £3)

SOLDERLESS SIDEWAYS ROM SOCKET BOARD



In the May 1986 *Micro User's* independent review, the writer concludes, "The board has been well laid out. Its position is much better than others – not over the HOT RAM chips and further away from the disc controller area". "I give the solderless ROM board the thumbs up and wish it success".

This brand new board from Watford Electronics is designed specifically for those wishing to add a ROM board to their own BBC without the need to perform any soldering.

This new board expands the total possible number of ROMs in a BBC from 4 to 16.

Unlike our competitors inferior boards, the ONLY upgrade required for fitting battery backup to the Watford Solderless ROM board (all Watford ROM boards, actually) is the fitting of the battery itself. (No other expensive components are required.)

- The key features of this new, no fuss, easy to install quality product from BBC leaders Watford Electronics are as follows:
- Increase your BBCs capacity for ROMs from 4 to 16.
- **No soldering required.**
- Very low power consumption.
- Minimal space required.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish") allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £32
Battery backup fitted **£36**
(carriage £2)



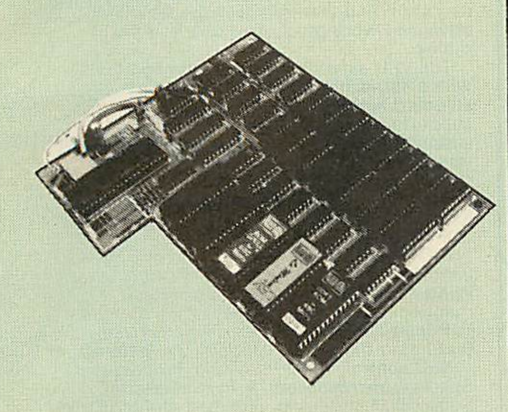
THE BBC + Micro ROM EXPANSION BOARD

Specially designed for all BBC Plus users, this board sits in an external box, and will accept either 10 off 16k EPROMs, OR 10 off 32k EPROMs.
With the 32k EPROMs, only 5 can be 'online' at once (that's all the B+ can address, as each chip 'holds' two normal sockets worth), but you can swap between the two banks if necessary. With the 16k EPROMs, you can obviously address them all at once. An extra card can be added to permit 2 banks of 10 EPROMs to be used (again with only one bank available at once).
The ROM box, which has its own mains power supply, and connects to the BBC Plus via a specially designed card (which is a buffered card for your peace of mind) permits easy access to the EPROMs via the hinged lid. NO soldering is required for this board.

£79 (carr £2)

Watford ROM/RAM CARD

A must for all serious users



Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 3 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, the new Watford Electronics ROM/RAM board. This highly versatile and sophisticated board represents the latest in "2nd generation" sideways ROM technology for the BBC micro, designed to satisfy the serious BBC user.

- NO SOLDERING required to fit the board.
- NO overheating problems.
- No User Port corruption (avoids problems with the mouse, modems, Eprom Programmers, etc.)
- Fully buffered for peace of mind.
- Firm mounting in BBC micro.
- Compatible with all BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of Battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- Accepts any ROM.
- FREE utilities disc packed with software.
- Compatible with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- UNIQUE Fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROM-SPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM-RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM-RAM Board.

The ROM-RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, for later.

Please write in for further details.

INTRODUCTORY PRICES:

- *ROM/RAM card with 32k dynamic RAM* **£39**
- ROM/RAM card with 64k dynamic RAM **£52**
- ROM/RAM card with a massive 128k dynamic RAM **£80**

(carriage on ROM-RAM Card £3)

OPTIONAL EXTRAS:

- *16k plug-in Static RAM kit* **£6**
- *16k Dynamic RAM for Upgrade* **£7.50**
- *Battery backup* **£3**
- *Read and Write protect switches* ...... **£2 each**

Complete ROM-RAM board (all options installed) **£89**

Le Modem



The MODEM from Watford

At last a professional MODEM for the BBC Micro. Unlike other 'Modem packages' this is a complete package there are no extra software costs to get 'up and running'. Of course Le MODEM is multi-standard, i.e. 300/300, 1200/75 & 75/1200 UK and BELL (USA) are all supported.

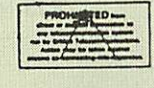
The features that make Le MODEM such good value are:

- *A complete communications terminal that transforms your BBC Micro into a very powerful World-wide data transfer system.*
- *Auto Dials, Auto answers, and is completely controlled by your micro. There are no external controls!*
- *Allows you to access PRESTEL, B.T. GOLD, THE SOURCE, MICROLINK, MICRONET, MICROWEB, THE TIMES NETWORK, MICRO LIVE (BBC TV database), CITY BB and more.*
- *Designed to be SIMPLE but SOPHISTICATED. To LOGON to a data base all you have to know is its TELEPHONE NUMBER, Le MODEM does the rest.*
- *Supplied with a comprehensive telecomms package in a 16K sideways ROM which includes a FULL PRESTEL terminal allowing TELE-SOFTWARE to be downloaded.*
- *A comprehensive 80 column terminal. This includes XMODEM error checked transfer protocol, to allow error free data transfer anywhere in the world!*
- *FULLY controlled by simple '*COMMANDS allowing you to control it from your own BASIC programs. To get you started we supply a FREE disc of bundled software!*
- *Connects to the 1MHz bus. A *AUDIO ON-OFF command allows you to actually hear the telephone line through your BBC micro loudspeaker.*
- *Completely self contained with internal mains power supply. (Even a free mains plug is fitted!) A *TEST facility gives ON SCREEN indication that Le MODEM is working correctly.*
- *Packaged in such as way that you need nothing else except a BBC Micro to communicate with computers all over the world.*
- *FREE Membership to MicroLink.*
- *BT Approval applied for.*

(When ordering, please specify the version required, (BBC or Master)

SPECIAL OFFER

Price: **£74**
(carr £3)

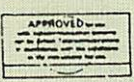


(Price includes, Le Modem, Software ROM, Cables & Comprehensive Manual)
(Write in for further details)

Nightingale Modem

SPECIAL PRICE to our Customers

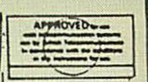
£99



(Price includes: Nightingale Modem, Commstar ROM pack, Cables & Comprehensive manual)

Nightingale Modem without software	**Only £87**
COMMSTAR ROM package only (P&P on modem £2.00)	**£29**
Auto Dial-Auto Answer Board (non BABT)	**£48**
Auto Dial Utilities Disc	**£9.50**
OBBS Bulletin Software	**£20.00**

APOLLO



The NEW Modem from Watford

Following numerous requests from you, our discerning customers for an APPROVED, Low Cost & High Performance modem with Auto Dial & Auto Answer facilities as standard) we bring you the versatile APOLLO Modem. Just compare the features and look at the price (which incidentally includes the cost of the Software, manual and BBC connecting cable). We are sure you will agree that Watford Electronics in their traditional way are giving you a super 'value for money' deal.

Just look at these features:

- V21 for Bulletin boards, Microlink, Telecom Gold, etc.
- V23 for Prestel, Home Banking, and other Viewdata services.
- Reverse V23 allows User run Viewdata service.
- 1200-1200 half duplex for communications.
- XMODEM, HEX and ASCII file transmission.
- Auto Dial of given 'phone number.
- Auto Answer for User's Bulletin Board.
- 80 column terminal with split screen facility.
- Prestel text screen dump.
- Fully BABT approved.
- FREE membership to MicroLink.

The Apollo is attractively finished in matt black. It opens the doors to world communication to both, the Hobbyist and the Professionals alike. With baud rates varying from 300/300 Originate and Answer, 1200/75 and 75/1200 full duplex and 1200/1200 half duplex, virtually all the popular tele-services can be accessed. A comprehensive Comms ROM oversees the use of the APOLLO, providing simple commands for all the software controlled facilities. APOLLO is an ideal modem for both the first time buyer and the seasoned user. Join the Telecommunications Revolution – Buy a Watford APOLLO!

Special Launch Price: **£75**
(Carr £3)
(Write in for full specification)

BT TELEPHONE CONNECTORS

LJU	1/4A Mini Line Master	**£4.50**
LJU	1/6A Mini Line Slave	**£3.00**
LJU	2/4A Line Master	**£4.00**
LJU	2/6A Line Slave	**£2.50**
LJU	3/4A Flush Master	**£3.95**
LJU	3/6A Flush Slave	**£2.75**
LJU	10/3A Dual Splitter	**£5.50**
	4 Way BT Plug	**£0.75**

Versatile BEEB SPEECH SYNTHESISER Unit



The Watford Speech Synthesiser is a very flexible speech synthesis unit based upon the powerful phonemes system. This system stores the building blocks of speech (called phonemes) and allows you to combine them quickly and easily to form virtually any word imaginable.

Supplied with an advanced ROM, you are provided with a 500 word dictionary to get you started. These can easily be added to by following the notes given in the comprehensive manual.

SPECIAL PRICE £32 (carr £2)

Continued



COMPUTER CONCEPT'S ROMS

ACCELERATOR	£48
CARETAKER Basic Utility	£25
Graphics ROM	£23
TERMI	£27
COMMUNICATOR	£49
SPEECH ROM	£26
Printmaster	£24

Wordwise £25

Wordwise plus

WORDWISE PLUS
£38

We are giving away absolutely **FREE**, the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

Word-Aid

The most comprehensive utilities ROM for Wordwise-Plus

Extend the power of your Wordwise Plus word processor with this most advanced ROM from Watford. By utilising the powerful Wordwise Plus programming language, WordAid provides a whole host of extra features, all accessed via a special new menu option. This ROM has been personally approved by Mr Charles Moir, the author of WORDWISE PLUS.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key option.
- Search and display in preview mode.
- Embedded command removal.
- Print Multiple copies of a document.
- Multiple file options for print and preview.
- Address finder.
- Label printer.
- Mail-merger.
- Number/delete/renumber.
- Clear text-segment area.
- BBC B, B+ and Master compatible.

Only **£24**

(N.B. Word Aid requires a Disc Interface in your Micro)

HI-WORDWISE-PLUS

Supplied on disc. This version requires a WORDWISE-PLUS ROM to be present in the machine. It gives up to 44k of text space on the 6502 2nd processor.

£5

Inter SHEET ONLY £38



ONLY: £26

Inter-WORD

Only: £44

Special Discount price for the existing Wordwise Plus owners. Simply quote your reg. number and pay.

Only: **£39**

All Prices Exclusive of VAT

VIEW

VIEW WORDPROCESSOR 2.1	£37

VIEW 3.0 ROM

Price: Only **£56**

HI-VIEW

A special version of VIEW designed for use with 6502 2nd Processor. Available on disc, it offers 47K of text memory.

£36

VIEWSHEET (Acornsoft)	£37
VIEWSTORE	£37
VIEWSPELL with 80 track disc	£29
VIEWPLOT Disc	£22
VIEW-INDEX	£12

Watford's own Sophisticated VIEW PRINTER DRIVER for Epson FX80 & KAGA KP

Only £10

VIEW DRIVERS FOR JUKI & BROTHER HR15 PRINTERS

Only £10

VIEW-VIEW SHEET PRINTER DRIVER for SILVER REED
(Officially approved by Silver Reed)

Only: £10

MINI OFFICE II (tape)	£14.50

REPLICA 3

This new improved REPLICA 3 from Clares is a very powerful disc based TAPE to DISC Utility. It now transfers even more programs than ever before. Replica 3 will not work with all programs but then neither will anything else. 30,000 Replicas have been sold to date. It has to be good.

£13 (40 or 80 track)

النور

ARABIC ROM
for the BBC Micro

The ALNOOR ARABIC ROM converts your BBC into a bilingual computer. New keytops provide both English and Arabic symbols. Two sets of Arabic symbols are provided for use in either context sensitive or insensitive operation.

20, 40 and 80 column operation. Compatible with ASMO (449). English-Arabic printer interface software. Numeric entry from either left or right of number. Communications software to send or receive 7 or 8 bit data.

Different shapes of Vowels (e.g. Shadda, Fatha, etc). Different shapes of Hamza. Full English and Arabic character sets with all special characters.

£85

(Price includes Alnoor ROM, Operating Manuals & a full set of Arabic/English Keytops)

VIEW PRINTER DRIVER ROM

(Professional facilities for demanding users)

View is a powerful word processor, but until now has seriously lacked in terms of printer support. With the launch of our Printer Driver ROM, which includes an extremely powerful and easy to use Printer Driver Generator, View users can find themselves in the realms of advanced word processing only at a small outlay.

The VPD extends View's printer command with a series of mnemonic commands. *All* standard highlight sequences are also supported. A large range of printers are supported by drivers contained within the ROM (the drivers can be downloaded and customised). Printers supported include: Epson's MX, RX, FX, FX, LX, JX80 range, HI80, KP810/910, PW1080, JP101, HR15, M1009, GLP, JUKI 6100, etc.

Other printers are readily supported by defining a Printer Driver using the built in Printer Driver Generator. The features mentioned below are available to both the built in Printer Drivers and user defined drivers (assuming the printer supports the features).

NLQ control, Underline, Bold, Proportional Spacing, Microspacing, Italic, Superscript, Subscript, Condensed, Enlarged, Double Strike, Set lines per inch numerically (e.g. LPI 6), Set characters per inch numerically (e.g. CPI 5), Select printer font, Select printer ribbon colour, Translation sequences, Emulation of BBC Character Set, Simple numeric expressions for certain operations, Full printer setup, Send control codes, Print prompt on screen, Redefinable Pad character, Pause for key press, Prompt to change daisywheel, and Execute * command when printing.

Other features include a very powerful on screen preview, with bold, italic, underline, super/subscript, enlarged highlights, and a special printer driver to allow memory based text to be previewed by View 1.4. Of course, View 1.4, 2.1 and 3.0 are all supported, as is Shadow RAM and 6502 Second Processors. The BBC B series and Master series of micros are supported. A comprehensive manual is supplied. All in all, a very professional product for the discerning user who wants power at their finger tips. (Write in for a detailed leaflet).

Price: Only £33



CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 50234-33383

THE INVESTIGATOR

This sophisticated Utility program on disc, enables you to make security back-up copies of most of your valuable Disc Software. Makes full use of all 8271 (will not run with double density DFSs) facilities to discover the precise format of your protected disc so that an exact copy can be produced. Supplied with detailed instructions. Please specify 40 or 80 track disc when ordering.

Only **£20**

ROMAS

THE CROSS ASSEMBLER AND MACRO EDITOR FOR SERIOUS PROGRAMMERS!

ROMAS is a carefully designed, sophisticated yet simple to use, development system for serious assembly language programmers. Using the BBC as the development system, you can choose your target system from the following processors:

6502, 65C02, Z80, 8085, 8041, 6809 and Z8
P.S. This includes the Acorn 6502 & Z80.

A give away at . . . **Only £29**

Please specify 40 or 80 track disc when ordering.



ARIES CORNER

Aries B-32 Shadow RAM Card

18 months of intensive research and development have produced a worthy successor to the widely acclaimed Aries-B20: the revolutionary Aries-B32. This 'second generation' expansion board features 32k of RAM and a 16k ROM socket.

Like the BBC B+, the B32 provides 20k of shadow screen RAM and 12k of sideways RAM. Unlike the B+, the B32 has simple software commands which allow the user to reconfigure the RAM as 16k of shadow RAM and 16k of sideways RAM, or all 32k as sideways RAM.

With the B32, the programmer gets up to 28k of RAM available for Basic, Logo, Comal, Forth, Lisp and BCPL programs in any screen mode. The business user gets extra memory for View, ViewSheet, Wordwise Plus and many other applications. For advanced applications, the scientific user gets access to a massive 47k of data storage using the Acorn approved *FX call.

Sideways RAM enables you to load sideways ROM images from disc, allowing you to have a large library of sideways ROMs (subject to the copyright holder's permission) stored on disc. The B32's sideways RAM can also be used to extend any operating system buffer (such as the printer buffer) or to load tape programs into a disc system.

The B32 simply plugs into the processor socket on your BBC micro – no flying leads to connect and no soldering. Provision of the on-board ROM socket means that the Aries-B32 control ROM does not use up one of your existing ROM sockets.

Price: B-32 **£80** (carr. £2)

Aries B-12 Sideways ROM Board

This board is extremely well made, simple to install, reliable when fully loaded and compatible with the Aries B-20 and the Aries B-32. For the business user or educationalist, the compact and secure internal fitting is ideal, with the ROM board tucked neatly inside the lid where it will not cause overheating problems. The serious software developer and the hobbyist may prefer to mount the board externally, giving instant access to the sockets for experimental purposes. A zero-insertion force (ZIF) socket may be fitted to the board to enhance this mode of operation.

The B12 provides a total of twelve sideways ROM sockets (the four in the original machine are replaced by the twelve on the board), all fully accessible by the MOS sideways ROM system. In addition, there are two sockets for sideways RAM, giving up to 16k of RAM using 6264 static RAM chips.

The B12 system consists of two parts: a large detachable 'mother board' which carries the extension ROM sockets and a small 'base board' on a short ribbon cable, which plugs into the existing sideways ROM sockets. This two-board design eliminates the reliability problems previously associated with some other ribbon-cable based systems.

If you do not have an B32 or B20, a small adaptor module (the Aries B-12C) is available at a nominal cost. The 6264 static RAM chips used to provide the sideways RAM are advertised elsewhere in our advert.

Price:
Aries B-12 **£40.** Aries B-12C **£5**

THE ARIES RANGE HARDWARE REQUIREMENTS

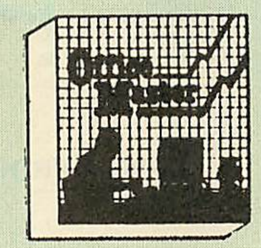
Aries B-32 & BBC B, MOS 1.20, hardware plugs into CPU socket.
Aries B-12 & BBC B, MOS 1.20, hardware plugs into all four sideways ROM sockets and connects to the B32 or the B20. The adaptor Aries B-12C module is necessary where these are not fitted.
Aries B-488 BBC B, MOS 1.20, Hardware plugs into 1MHz Bus.

ARIES B-488 IEEE-488 INTERFACE UNIT

The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB' or 'HP-IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

Aries B-488 Unit: **£238** (Carr £3)

OFFICE MASTER



CASHBOOK – A complete "Stand Alone" accounting software package for the cash based sole trader/partnership business. It is designed to replace your existing cashbook system and will provide you with a computerised system complete to trail balance.

FINAL ACCOUNTS – Will take data prepared by the Cashbook module and produce a complete set of accounts as following: Trial Balance with inbuilt rounding routine; Notes to the accounts; VAT Summary; Profit & Loss A/C; Balance Sheet.

MAILIST – A very versatile program. Enables you to keep records of names and addresses and then print, examine, sort and find them, all with special selection techniques.

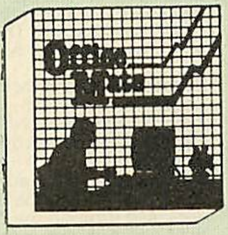
EASILEDGER – A management aid software tool designed to run alongside an existing accounting system. Essentially a Debit/Credit ledger system which can handle sales, purchase and nominal ledger routines to provide instant management information.

INVOICES & STATEMENTS – Greatly reduces the time and cost of preparing Invoices and Statements by storing essential information like customer names, addresses and account numbers. Has VAT routines and footer messages facility.

STOCK CONTROL – Allows you to enter stock received, stock out, summary of stock items and current holdings together with details of total cost, total stock to minimum level, units in stock ordering, quantity and supplier detail.

All this for only **£21**
(Cassette or Disc)

OFFICE MATE



- DATABASE
- BEEBCALC SPREADSHEET
- BEEBPLOT GRAPHICS
- WORD PROCESSOR

DATABASE – Set up a computerised "card index" system and add records/data to the file your way. Features include search, sort, mathematical calculations, printer routines, data summaries, etc.

SPREADSHEET – Offers a wide range of invaluable calculation and editing features. Beebplot will take files created by Beebcalc to provide data portrayal in graph, histogram or pie chart format.

BEEBPLOT – Provides an easily assimilated visual representation of numerical data.

WORDPROCESSOR – Provides many routines found in large and expensive packages.

OFFICE MATE Only £10
(Cassette or Disc)

THE EUREKA CARD

(The Unique RAM Expansion System)

The Eureka Card is Watford's latest and most sophisticated RAM expansion system. Using advanced PAL based technology this card is a breakthrough in RAM systems for the BBC micro. The Eureka Card provides the user with around 58K of free memory in Basic, VIEW and WORDWISE PLUS. You also get Shadow RAM from within the active language. No other RAM expansion system can match that!

Load up to 58K long Basic programs. Texts in VIEW and WORDWISE PLUS up to 58K as well. This with absolutely NO loss of speed in accessing your text or program. Eureka consists of a card containing 64K of program memory, two parallel banks of sideways RAM and some extremely complex switching circuitry. This is all controlled by Eureka's highly sofisticated software supplied in ROM. Designed to a very high specification, this board is fully buffered to give reliable operation under virtually any circumstances.

The Eureka board plugs into the 6502 socket and has NO messy flying leads. It is compatible with many other products from Watford, such as our Solderless ROM Board and our ROM/RAM Board. All in all, the Eureka Card is an amazing board. Jump into the age of serious data processing with a Eureka Card! Please write in for further details 'on advantages the Eureka can offer you'.

Introductory price: Only **£89** (carr £3)

(P.S. Eureka is only suitable for a standard model B; it normally replaces any Shadow RAM cards present. Some speed degredation does occur with filing system access. Eureka cannot be used at the same time as a second processor).

BEEBMON

The most powerful machine code monitor for the BBC Micro **£24**.

DISASSEMBLER ROM ONLY £16

DATAGEM

Gemini's popular Database package
Only: £34

Money Management

This disc based software allows individual transactions to be stored and retrieved for upto 5 Bank a/c and 5 Loan accounts.

Price: Only **£11**

L.B.O. Rom

Life & Business Organiser

TAKE IN A-W

Use LBO to organise your life from today until 1999! It can handle literally hundreds of multi-line messages, as many as you are ever likely to need. Despite the very wide range of facilities offered, this professional program is VERY easy to use and requires absolutely NO knowledge of computers. A vital aid to your everyday life, LBO is GREAT FUN TO USE!

Price only: £17

D D D Suite Integrated Software System

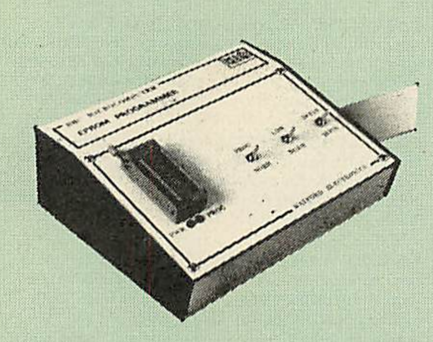
-BASE **£12**
-CALC **£12**
-PLOT **£12**
COMBO PACK All 3 together **£26**

Continued


BOOKS (No VAT on Books)

30 Hour BASIC (BBC Micro)	£7.95
40 Best machine Code Routines	£7.95
6502 Assembly Language Program	£19.95
6502 Application	£11.95
6502 Assembly Lang. Subroutines	£19.95
6502 Development System	£7.50
6502 Machine Code for Humans	£7.95
68000 Assembly Lang. Programming	£19.95
68000 Machine Code Programming	£13.00
68000 Programming the	£22.95
6809, Programming the	£16.95
A User Guide to Wordwise Plus	£9.95
A Young persons Guide to BBC Basic	£5.95
Advanced Disc User Guide	£16.95
Advanced BASIC ROM User Guide	£9.95
Advanced User Guide for BBC	£15.95
Advanced Graphics with BBC	£9.95
Assembly Language Programming on BBC Micro	£11.50
Advanced Programming Techniques for the BBC Micro	£8.95
Adventure into BBC BASIC	£6.95
Applied Assembly Lang. for BBC	£9.95
Assembler Routines for the 6502	£7.95
Assembly Language Programming FOR the BBC Micro	£8.95
Assembly Language Programming on the BBC & Electron	£8.95
Basic ROM User Guide	£11.95
Basic User Guide for BBC Micro	£10.00
BBC B+ User Guide	£14.95
BBC Forth	£7.50
BBC Micro & the small Business	£5.75
BBC Master 128 High Flyer	£10.95
BBC Micro Advanced Ref. Guide	£10.95
BBC Micro Advanced Programming	£10.00
BBC Micro Book BASIC Sound & Graphics	£7.95
BBC Micro Disc Companion	£8.95
BBC User Guide	£10.00
BCPL User Guide	£14
Complete FORTH	£6.95
CP-M-86 User's Guide	£19.95
CP-M Bible	£16.50
CP-M Handbook with MPM	£9.95
CP-M Plus Handbook	£13.95
CP-M Soul of	£16.50
CP-M The software BUS	£8.95
Creative graphics on BBC Micro	£7.50
Disc Drive Projects for Micros	£5.45
DISC FILING SYSTEM (DFS) Operating Manual for BBC	£6.95
Disc Programming Techniques	£9.95
Discovering BBC Micro Machine Code	£6.95
Disc System for the BBC Micro	£6.95
Exploring FORTH	£6.95
FORTH on the BBC Micro	£7.50
Functional Forth for the BBC Micro	£5.95
Graphs? Charts on BBC Micro	£7.50
Hackers Handbook	£4.95
Hackers Handbook - New	£6.95
Interfacing & Robotics on BBC	£15.95
Into View	£4.50
Introduction to COMAL	£9.50
Introduction to LOGO	£6.95
Introducing 'C'	£9.95
Introducing LOGO	£5.95
Introduction to FORTH	£8.95
Introduction to PASCAL	£17.95
ISO-PASCAL Reference Manual	£9.95
LISP 2nd Edition	£14.95
LISP, A Beginners Guide to	£10.95
LISP the Language of Artificial Intelligence	£9.95
Logo Programming	£9.95
Mysteries of DISC DRIVES and DFS REVEALED	**£5.95**
Mastering Assembly Code	£8.95
Mastering CP-M	£17.95
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Mastering the Disc Drive	£7.95
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The Epson FX-KAGA PRINTER Commands REVEALED	**£5.95**
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View Guide	£4.50
Viewsheet User Guide	£10
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Wordstar & CP/M made easy	£7.45
Wordwise Plus Guide	£9.95
Z80 Applications	£15.95
Z80 Assembly Language Programming	£19.95
Z80 Reference Guide	£9.95

EPROM PROGRAMMER



The Watford Electronics' EPROM programmer for the BBC micro is a high quality self contained package. Programs all popular EPROMs from 2K to 16K: 2716, 2516, 2532, 2564, 2764 and 27128. All manufacturers' specifications have been followed to program EPROMs at the correct speed – wrong timings could destroy your EPROMs. The unit has its own power supply so does not put heavy loads on the BBC power supply as do some other units. Connects directly to the 1MHz bus following all Acorn recommendations on addressing and bus loadings.

SOFTWARE PACKAGE
The software is supplied on an EPROM which plugs into the Micro and is instantly available with a single command (no time wasting as on Cassette-disc loading). It is a fully purpose designed and ingegrated package to simplify ROM development. The system is menu driven with many prompts to avoid any accidents.

Software facilities include:
Load File – Save File – Down Load EPROM – Program EPROM – Verify – Blank Check – Editing of memory contents prior to programming.
Also included is an automatic system to allow Basic programs to be put in EPROM and accessed through the *ROM filing system. More than one program may be put in an EPROM. All these facilities and more are explained in the comprehensive and clear 15 page manual.

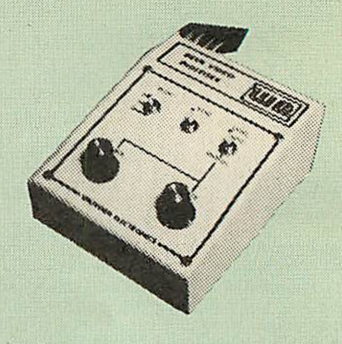
SPECIAL OFFER £69 (£3 carr.)

TEX EPROM ERASERS

EPROMs need careful treatment if they are to survive their expected lifetime. Over erasure of EPROMs very rapidly turns them into ROMs! The TEX erasers operate following the manufacturers specifications to give the maximum possible working life by not erasing too fast. We use these erasers for all our own erasing work.

- **ERASER EB** – Standard version erases up to 16 chips. **£28** (carr £2)
- **ERASER GT** – Deluxe version erases up to 18 chips. Has automatic safety cut-off to switch off the UV lamp when opened. **£30** (carr £2)
- Spare UV tubes. **£9**

BEEB VIDEO DIGITISER



Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro.

This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket.

Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem.

The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.

Both the black and white levels can be adjusted manually for the optimum picture, or switched to automatic for unattended use. The image produced can be reversed if necessary.

Full controlling software is supplied on a normal sideways ROM and this is easily accessed via additional * commands. The package is designed to allow easy input of complex screens and give full access of the data to the user. Once on the screen, the image can be used as a normal graphics screen, allowing any of the usual graphics commands in BASIC or other ROM's to work on it.

A special print dump routine is included with the driver programs. This is specially designed to produce a fast, correctly proportioned picture, with reduced "contouring", resulting in an accurate reproduction of the original image.

Detailed examples of driving this unit from BASIC or other languages are all provided in the extensive manual supplied.

£109 (Carr. £3)

(Price includes) Digitiser Unit, Software in ROM & a Comprehensive Manual)
(BBC B+ and Master compatible, except Master with Econet)

Magazine Maker

(As seen on TV)
A combination of the AMX Pagemaker and Watford's Beeb Video Digitiser.

Using any video that provides a composite signal and the digitiser, images from a camera or TV can be converted into a graphics screen on the BBC Micro.

They can then be used within AMX Pagemaker to illustrate magazines or newsletters – in fact anything that needs to be created on A4 size paper.

With Pagemaker's many features, a variety of pictures can be composed – the only limit being the imagination.

Pictures can be doctored using Pagemaker's graphics option to produce any number of effects.

Text can be formatted around the digitised photo on screen using the facilities available, which include 16 typefaces, character and pattern definer, text formatting and the ability to load in wordwise and viewfiles plus much more.

Once created the picture can be printed out.

The Magazine Maker is suitable for any use that requires illustrated documents.

Complete Package **£129.00** (carr. £3)

VOLTMACE JOYSTICKS

Delta 3B Single Joystick	£10
Delta 3B Twin Joysticks	£16
Delta 14B Single Joystick	£12
Delta 14B/1 Adaptor Module	£12
Transfer Software Disc-Tape	£7

ROM EXTRACTION TOOL

This extremely useful tool allows you trouble free chip removal from your computer by distributing the removal force over the whole body of any 24 or 28 pin chip.

Price: **£2**

SURGE PROTECTOR Plug

Fitted in place of your normal mains plug, this device protects your equipment against mains surges. Nearby lightning strikes, thermostats switching and many other sources which put high voltage transient spikes on to the mains. This can lead to data corruption in memory and on disc and can result in spuriously crashing machines. A must for every computer user.

Protection for only **£6.99**

ATTACHE CARRYING CASE for BBC Micro

This attache carrying case is attractively finished in mottled antique brown leatherette. An ideal and safe way of carrying your BBC Micro around. Supplied with two Keys.

Price: **£13** (£2 carr.)

28 pin ZIF SOCKET (Textool)	**£6.95**

28pin DIL HEADER PLUG

SOLDER type	£1.50
IDC CRIMP type	£1.95

SPARES for BBC Micro

Keyboard	£46	Keystrip	£2
UHF Modulator	£4	Case	£25
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Power Supply	£59	Keyswitch	£1.50

Replacement FLEXIBLE Keyboard Connector £3

8 WAY DIP SWITCHES

With these DIP switches soldered to their keyboard, any BBC B or B+ owner can take full advantage of the fast disc drives that we supply by configuring his BBC for fast disc drive operation.

Excellent value for money at **£1.00**

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(All ready made and tested(

CASSETTE LEADS 7 pin DIN Plug	
to 5 pin DIN Plug + 1 Jack Plug	£2.00
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to 7 pin DIN Plug	£2.50
to 3 Jack Plugs	£2.00
6 pin DIN to 6 pin DIN Plug (RGB)	£2.50

DISC DRIVE POWER LEADS

Supply from BBC power supply to standard Disc Drive connector.

Single **£3.00** Dual **£3.75**

DISC DRIVE INTERFACE LEADS

BBC to Disc Drives Ribbon Cable

Single **£4** Twin **£6**

MISCELLANEOUS CONNECTORS

	Plugs	Sockets
RGB (6 PIN DIN)	30p	45p
RS423 (5 pin Domino)	40p	50p
Cassette (7 pin DIN)	25p	65p
ECONET (5 pin DIN)	20p	30p
Paddles (15 pin 'D')	80p	200p
BBC Power Plug 6 way	80p	–
Disc Drive Plug 4 way	75p	–
6 way Power Connector	–	95p

Watford Electronics' Dealer's List

UNITED KINGDOM

Badger Micros (Devon), Badger's Hill, Southerton, Ottery-St. Mary, Devon EX11 1SE. Tel: 0395 68516.

Beebug Retail, Dolphin Place, Holywell Hill, St. Albans.

Cambridge Computer Store, 4 Emmanuel St., Cambridge CB1 1NE. Tel: 0223 358264.

Cirkit Distribution Ltd, Park Lane, Broxbourne, Herts.

C.J.E. Micros, 78 Brighton Road, Worthing, West Sussex. Tel: 0903 213361.

Dennis Spitz Computers Inc, 86 Golders Green Road, London NW11.

HCCS, 575-583 Durham Road, Low Fell, Gateshead, Nr. Newcastle Upon Tyne. Tel. 091 4870760.

Mancomp Ltd, Printworks Lane, Levenshulme, Manchester. Tel: 061-224 1888-9888.

Microman Computers, Rainford Industrial Estate, Mill Lane, Rainford, St. Helens

Peartree Computers Ltd, St. Georges Street, Huntingdon Cambs.

Verospeed Ltd, Boyatt Wood, Eastleigh, Hants.

OVERSEAS DEALERS

*Absolute Electronics, Rewal House, 208-210 La Trobe Street, Melbourne, 3000, Victoria, Australia. Tel: (03) 663 2411.

Alpha Computer Co, Shop 314 Chi Fu Commercial Centre, Chi Fu Fa Yuen, Hong Kong, Tel: 5-506592.

Computer Distribution Company, Parklaan, 47, B09300 Aalst, Belgium.

E.B.N., Elisenstrasse 13, 1000 Berlin 41. Tel: (030) 7952057

Lendac Data Systems, Unit 31, IDA Enterprise Centre, Pearce Street, Dublin 12. Tel: 710796.

Scientex P.V.B.S., Zilversmidstraat 2, B-2000 Antwerpen, Belgium, Tel: 03 233 59 06

Techno-matic Data, Holbergsgade 19, 1057 Kobenhavn K, Denmark

*Velobyte, Scheaedyksadyk 5a-6a, 3011 EB Rotterdam, Holland, Tel: (010) 413 8197/414 5171.

Viking Tecno, Vestergade 12.1, 9620 Aalestrup, Denmark, Tel: 08 642522

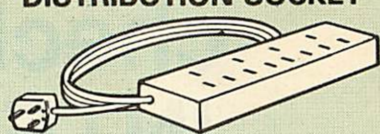
*Acorn/Watford Referral Centres.

Viglen Console Unit

Enhance the appearance and convenience of your BBC Micro & Master with the Viglen console unit.

BBC **£42**; Master **£51** (carr. £4)

4 WAY MAINS DISTRIBUTION SOCKET



4 way top quality mains trailing sockets. Supplied wired up with mains plug ready for use. Can be screwed to floor or wall if required. Very useful for tidying up all the mains leads from your peripherals. Allows the whole system to be switched on from one plug.

£9.50 (carr £1.50)

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BBC B, B+ & Master Compatible.

Now available, a limited number of Music 500s at give away prices. You too can receive the music package that has already thrilled thousands for:

ONLY £49

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Software Disc 'Mu-500' has 13 tunes **Only: £6**

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8271	£36	Acorn OS 1.2	£6
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RAM	£3.00	GXR-B	£21
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6512A	£10.00	ISO Pascal	£42
6522	£3.40	ISO-Pascal Stand	
6522A	£5.00	Alone Generator	£30
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7438	40p	Logotron LOGO	£45
74LS00	25p	Micro Prolog	£62
74LS04	25p	Microtext ROM	£48
74LS10	25p	ROMIT	£29
74LS123	80p	Serial ULA	£13
74LS163	70p	Video ULA	£15
74LS244	80p	TERMULATOR	£25
74LS245	£1.00	MUROM	£21
74LS373	£1.00	SLEUTH ROM	£23
74LS393	£1.00	STUDIO 8 Disc	£18
75453	70p	Toolkit Plus	£31
		Communicator	£49
		Disassembler	£16
		Help II	£27
		Datagem (Gemini)	£34

ASSORTED ROMS

ACORN BASIC 2	£19
ACORN ADFS	£25
ACORN DNFS	£17

Prices subject to change without notice and available on request. ALL OFFERS subject to availibility.

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Government and Educational Establishments' OFFICIAL ORDERS Accepted.

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CARRIAGE: Unless stated otherwise, minimum £1 on all orders. £2 on Larger items. On bulkier items, £7 Securicor charge applies. Overseas orders, carriage is charged at cost.

Specifications of all products are given in good faith but is subject to change without notice. Some items vary in their availability. Please ring for latest delivery situation.

Watford Electronics

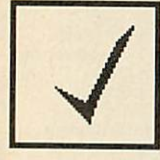
JESSA HOUSE, 250, Lower High Street, WATFORD, ENGLAND
Telephone: (0923) 37774; Telex: 8956095; FAX: 01 950 8989

The ultimate spelling checker for WORDWISE, INTER-WORD and VIEW

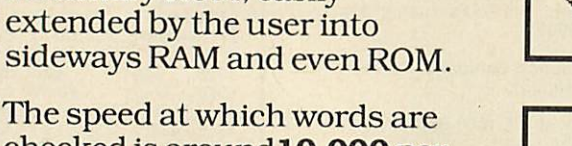
Spell Master is designed for use with all the major word processing packages -Wordwise/Plus, Inter-Word and View.

Spell Master occupies just *one* ROM socket, easily fitted to a model-B, B+, B+128, Master or Master Compact.



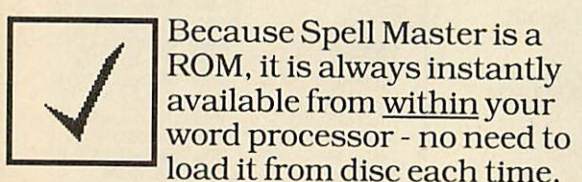


Over 50,000 words are stored permanently in the basic dictionary ROM, easily extended by the user into sideways RAM and even ROM.



The speed at which words are checked is around **10,000 per minute...** much faster than any other spelling checker available.

Because Spell Master is a ROM, it is always instantly available from within your word processor - no need to load it from disc each time.



The ultra-fast checking speed allows a convenient check-as-you-type mode to be used. In this mode, every word is instantly checked without loss of typing speed.



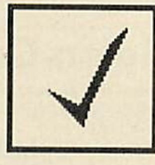
If you are unsure of the spelling of a word, a special 'fuzzy match' facility will list words which approximate to your guess at the spelling.



At any time at all, whether in a word processor or not, a 'browse' facility will enable any area of the dictionary to be examined.



Extra star commands provide many unusual facilities associated with words - anagrams, crossword solutions, and so on...



MONEY-BACK GUARANTEE: If you are not completely satisfied with Spell Master, we will refund the cost of any purchase made direct from Computer Concepts.

A more detailed specification is available upon request

Recommended retail price £51.30 + VAT (£59.00 inclusive)
Available direct from Computer Concepts and all good BBC dealers



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NEW BBC PRODUCTS FROM CLARES

FONTWISE PLUS £20.00



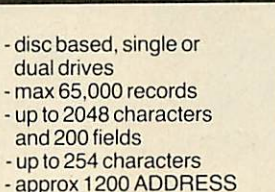
FONTWISE PLUS is now compatible with VIEW, MINI OFFICE II, EDWORD 2 and INTERWORD as well as WORDWISE and WORDWISE+!

Now you can have PROPORTIONAL and JUSTIFIED text in 12 different fonts, all within the same document if required. In addition to the standard facilities like line and page length, pagination, left margin etc. we have now added

- Enlarged, standard & condensed fonts
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- User definable line feed
- User definable character spacing
- Non proportional fonts
- Now with 12 fonts
- Plus many more features

If you are not convinced ask us to send you a sample printout and you will be amazed at the quality - requires an EPSON compatible printer capable of single, double and quad density graphics but you do not require any RAM in your printer to use FONTWISE PLUS.

BETA-BASE £25



SPECIFICATION

1) Random Access	- disc based, single or dual drives
2) File Size	- max 65,000 records
3) Record Size	- up to 2048 characters and 200 fields
4) Field Size	- up to 254 characters
5) Holds	- approx 1200 ADDRESS records per 100k
6) Search	- 5 search fields using powerful options
7) Sort	- 500 records on 3 fields in 60 seconds.

SYSTEM FEATURES

*CALCULATE - using any valid expression
*PRINTOUT - Powerful options
*REDEFINE - Titles, fields etc.
*TRANSFER - From one file to another
*GLOBAL ENTRY - of repetitive data
*SEARCH LISTS - Allow creation of sub Databases within main Database
*SPOOLER - enables you to create spooled files that are compatible with Wordwise, View etc.
*INPUT - is a routine included on the disc which will allow you to write your own utilities for accessing your data. Many of the programs on the utilities disc were written using this procedure

BETA-BASE UTILITIES £12.00

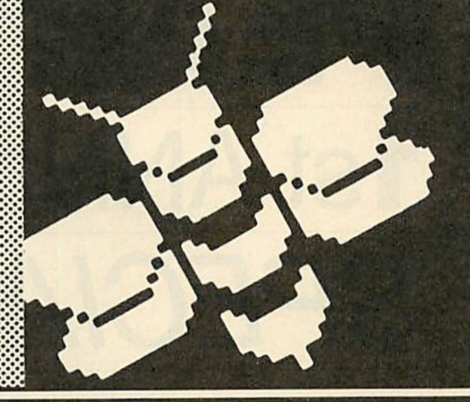


Extend the power of Beta-Base with the extra facilities provided on this disc.

*MAIL MERGE
*LABEL PRINTER
*DISC SORT
*EXTENDED SEARCH
*FREE FORMAT TRANSFER
*FAST PACK
*STATUS

The MAIL MERGE alone is worth £12 so you get a real bargain with this disc. The features are so numerous that we cannot mention them all here.

Ask for our UTILITIES DATA SHEET if you want more information.



MACROM £40 £35 DISC



MACROM is a fast full featured MACRO ASSEMBLER ROM that allows the use of macros, which are loaded from a macro library stored on disc. Assembly can be from disc to memory, disc to disc, memory to memory or memory to disc, thus allowing the use of very long source code up to the length of your disc. MACROM source code is tokenized and thus takes up far less room in memory or on disc than most assemblers.

- Operate in any mode
- Tokenized source code
- Assembles 6502 & 65C02 codes
- Automatically loads macros from library on disc
- Automatically loads subroutines from disc
- Macro library supplied plus demo files
- Chain program sections into main code
- Many different assembly options
- Converts BBC assembler code into MACROM source code
- Very fast & very flexible

In a comparison with ADE, MACROM was able to assemble a program to disc in 1 min 24 secs compared to 5 minutes with ADE and the source code took up 30% less room on the disc.
Ask for a data sheet today

RAMROD £40 ROM £35 DISC





RAMROD is the ultimate in toolkit ROMs and is fully compatible with the whole BBC range from Model B through to the MASTER 128 and including both 6502 and TURBO co-processors. RAMROD adds 54 new commands to your computer. Areas covered are DISC (DFS & ADFS), GENERAL (memory commands etc.), ROM (including sideways RAM) and TUBE.

RAMROD provides commands to dump memory or a disassembly of memory to a printer. Editors can display the screen in 40 or 80 column mode.

DISC
Edit discs and search for ASCII or HEX sequences.

GENERAL
Edit, search, disassemble, compare, dump to printer and relocate ANY area of memory including the SHADOW screen. List vectors in use, load and save function keys even on MASTER etc.

In addition to the above you can move between ROM/RAM banks using (CTRL) Cursor Keys when in either memory or disassembly mode PLUS you can switch between memory editor and disassembler by pressing (CTRL)(TAB).

ROM
Includes commands for listing, loading, saving, wiping, swapping, ROM images. PLUS formatting and titling RAM banks for the ROM filing system and saving programs in RFS format.

TUBE
Provides the same memory commands as GENERAL plus SHIFT and COMPARE memory across the TUBE both ways.

We cannot do justice to RAMROD in the space here so please ask us to send you a fuller data sheet - RING NOW!

NEW PRODUCTS
Watch out for a fabulous new product which will be released during SEPTEMBER for the MASTER and its compatibles.

This is a high quality art package called ARTROOM but it offers many features not provided elsewhere. It is a full screen package and is written by the authors of FLEET STREET EDITOR so you know that it will be good.

Ask for a data sheet NOW!

40 80 3" 0 ________ DISC
40 ________ 40 TRACK
80 ________ 80 TRACK
3 ________ 3" DISC - ADD £3
________ EPROM

Send for detailed newsletter.
All prices inclusive of VAT & Carriage - NO EXTRAS! Please state 40 or 80 track disc and state D.F.S. you use.



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Your **Privilege Card** will cost you just £5—less than 10p a week—and for this you will receive **service** and **prices** which will be second to none:

- First, you will receive a **5% discount** on all our advertised goods, and up to **25% discount** on all repairs.
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- You will have access to our **Technical Hotline**, to help with any problems you may have.
- At the end of each year we will send you a **Gift Voucher** to the value of 1% of the goods you have purchased during the year.

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So please hurry and fill in the form opposite, mail it FREEPOST to our address and immediately we will send you your **Privilege Card** so you can **take advantage of the savings**

Yours sincerely

V.G.M. *Marketing Director*

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PEARTREE COMPUTERS

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Please rush me your Privilege Card.

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Address ______________________

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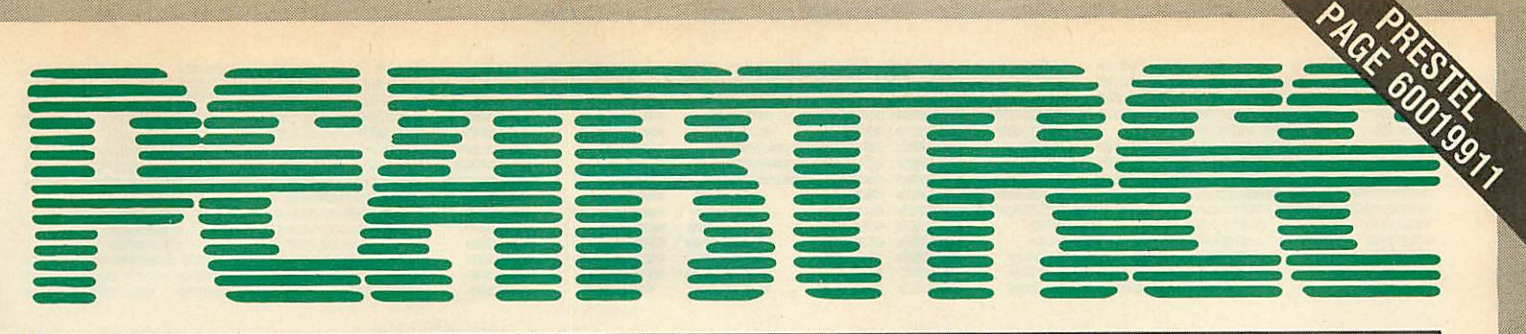
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I enclose my cheque for £ ______ or please debit my Access or Visa Card No

Date card expires ______________________

Signature ______________ date ________

Send this coupon to: Peartree Computers, Department 80, FREEPOST, St George's House, 14 George Street, Huntingdon, Cambs PE18 6BR.



THE ACORN MUSIC 500

Now available from **Peartree** the Acorn Music 500 for the BBC, BBC B+ Master 128 and a new revolution on the

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ACORN USER magazine thought it was fantastic; so did **MICRONET**; so did **A & B COMPUTING** and **BEEBUG; so will you.**

Call us on **(0480) 50595** and we'll tell you all about it.

HP19

Music 5000. It has been upgraded from Music 500 with modifications on the main PCB board.

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We accept  

*When ordering, please specify which computer system you own. **PLEASE USE OUR CODES WHEN ORDERING**

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PEARTREE

PRESTEL PAGE 60019911

HARDWARE

HC2 BBC MASTER 128 £385.00
* 128K
* Complete with View, Viewsheet, A Basic editor, Termulator, ADFS, 1770 DFS and Basic
* Battery backed up RAM
* Two ROM cartridge sockets
* Numeric keypad

HC3 MASTER COMPACT £385.00
* 128K computer
* 640K disc drive built into a monitor bridge
* RGB, comp video, joystick and printer port
* Includes Sprite ROM, View, Filing System etc.

HC218 MASTER COMPACT (TV) £399.00
* As above
* With TV modulator

HC224MASTER COMPACT (MONO) £445.00
* As above
* With Hantarex high res mono monitor

HC44 MASTER COMPACT (COLOUR) £559.00
* As above
* With Hantarex medium res monitor

HC1 1.6MHZ BUS INTERFACE FOR MASTER COMPACT £29.95
* Gives you a 1MHZ BUS compatible interface
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* Connect teletext adaptor or Winchester
* Simple plug in adaptor

HC7 512K UPGRADE £189.00
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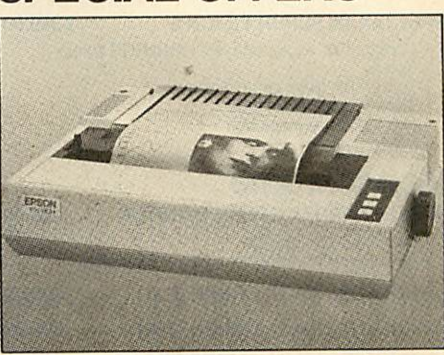
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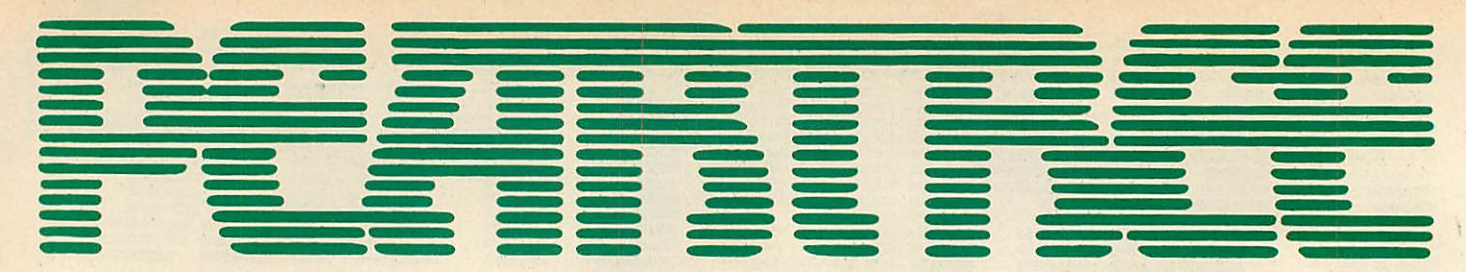
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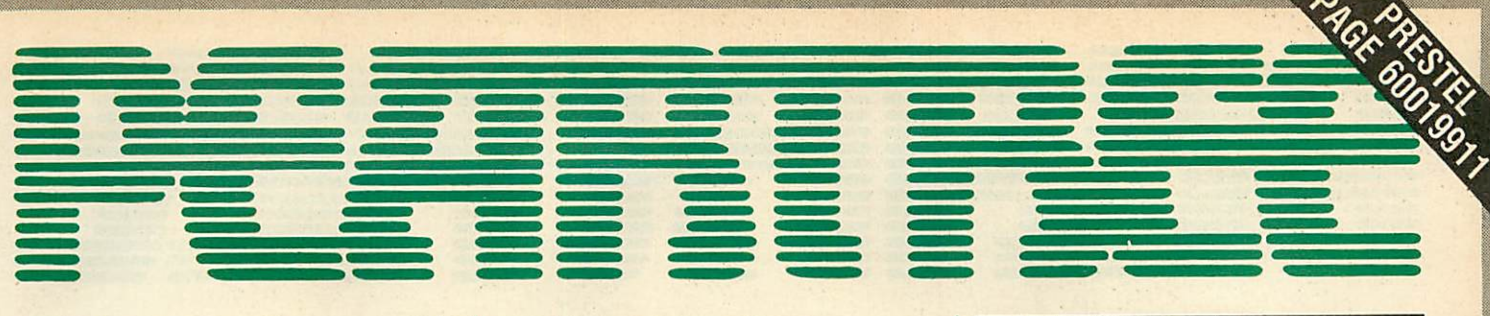
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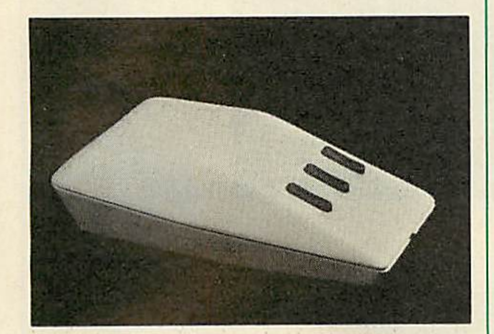


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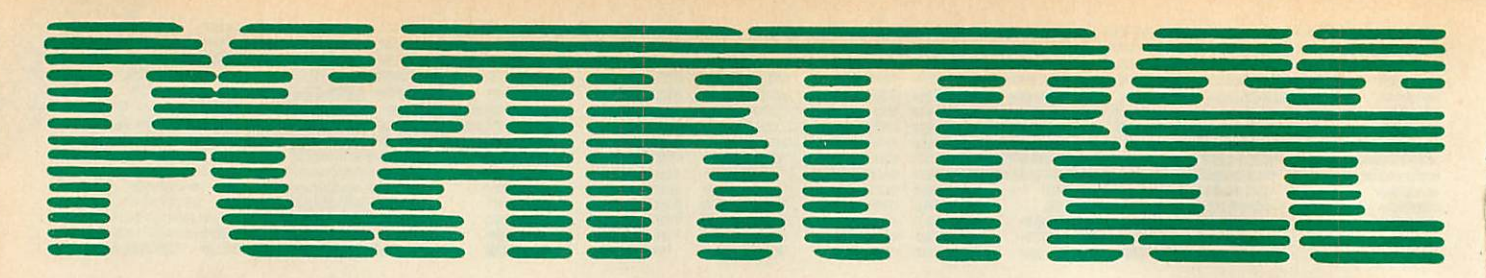
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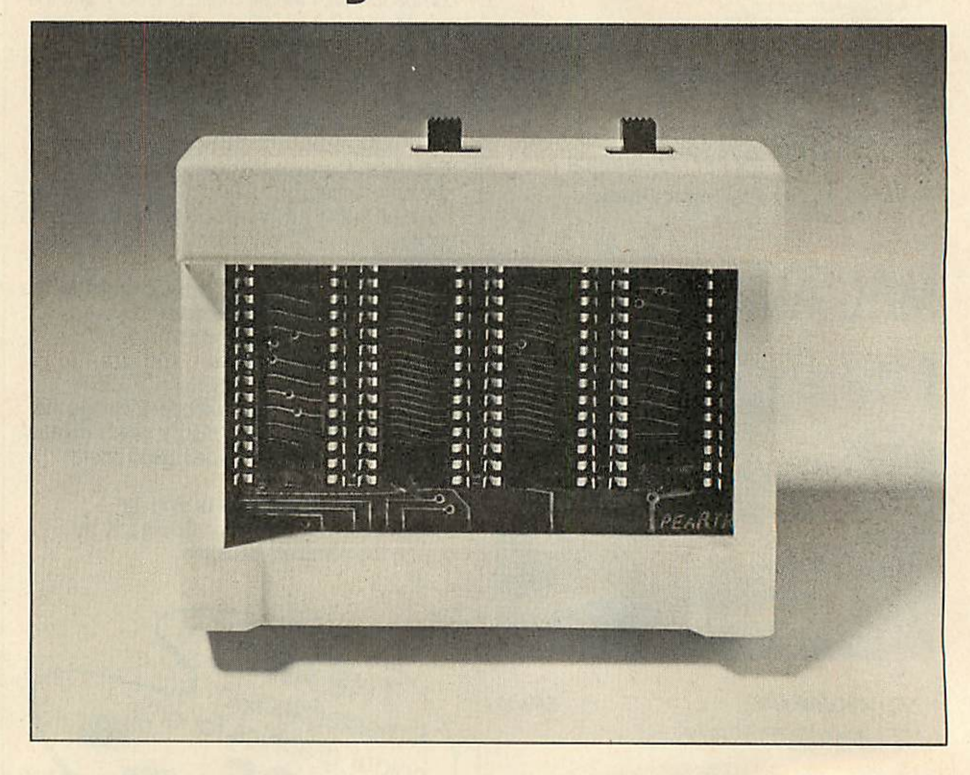
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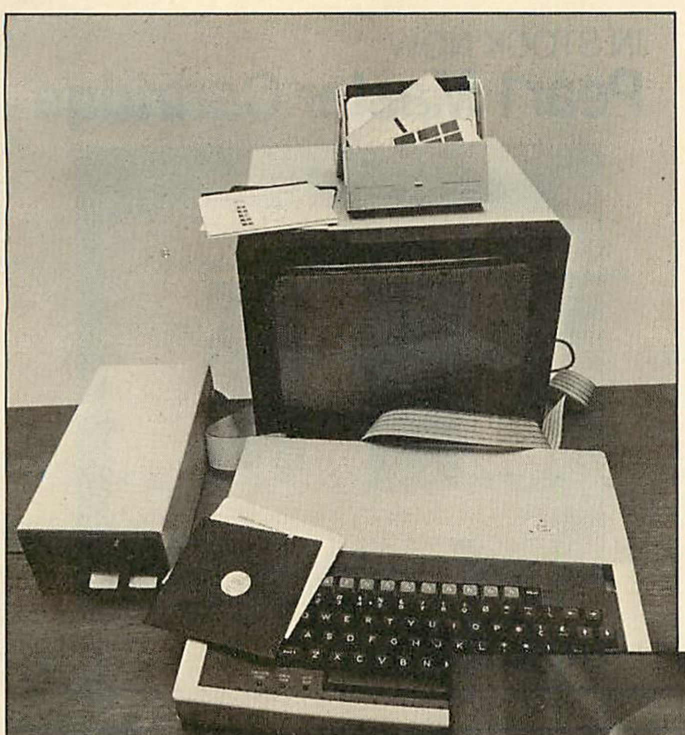
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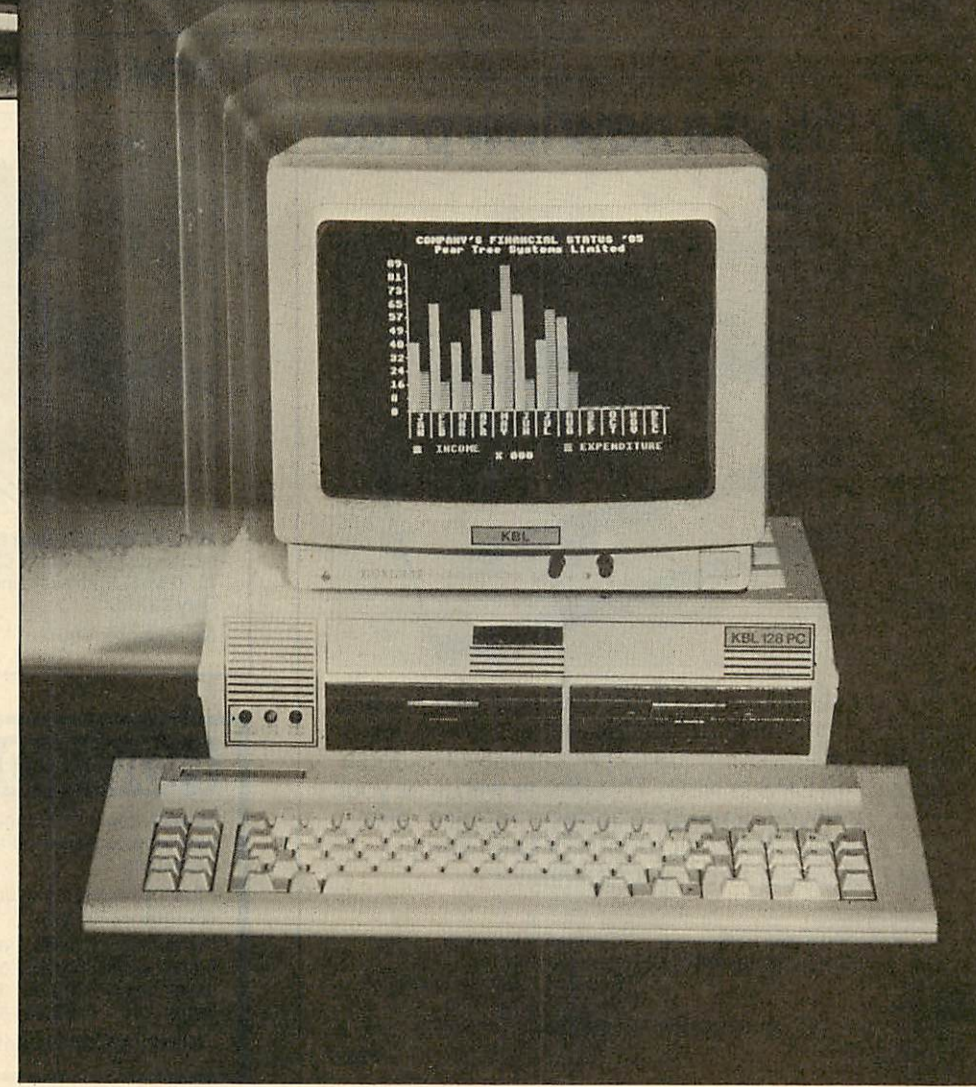
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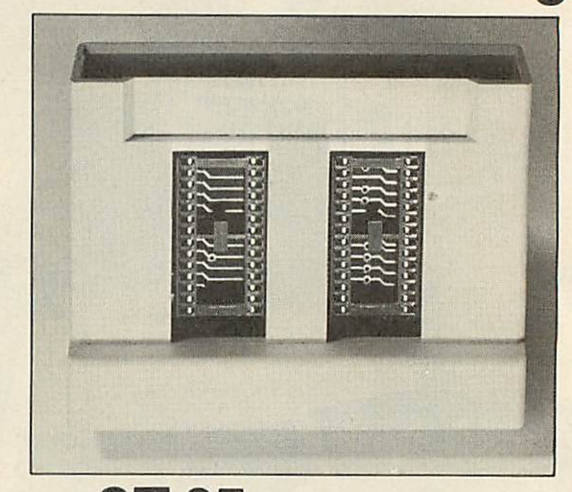
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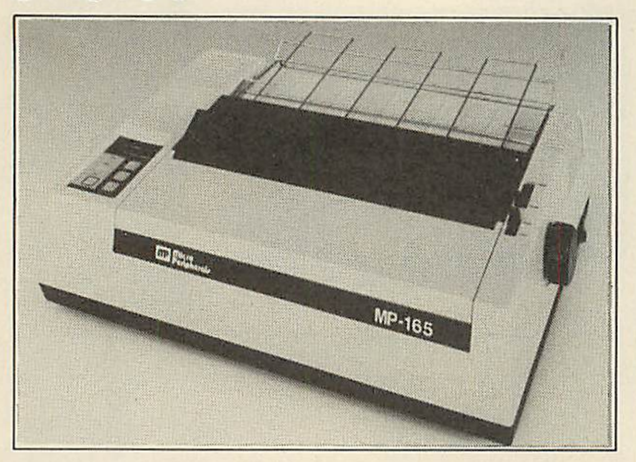
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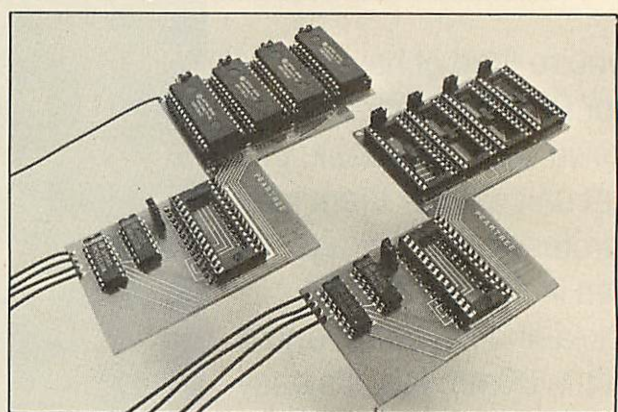
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WHISTLE UP YOUR MICRO

This month we learn how to build a tiny interface to use with your micro so it obeys whistled commands

Joe Telford

This *Acorn User* Project began innocently on a frosty morning in October. Your favourite author (No, not Brucie!) dashed down the grand staircase at Telford Towers, did an about turn and dashed back up. 'Where are my car keys?' No answer. 'I'm late, who's got those blessed keys?' Grunts from the master (sic) bedroom, 'I can't miss this meeting. Alex is only let out once a year!' Suddenly a response! 'Try the kitchen, behind the kettle, under some newspapers.' I dashed back down the stairs, found the keys and took off.

On returning to the Towers, her ladyship pointed to a small parcel on the table. 'For you', she indicated. I opened the packet gingerly, and found a small 4cm by 6cm by 1cm plastic box which contained a key chain. 'Put your keys on that!' She was obviously in no mood for a refusal. I did as I was told. When done the keys were hidden from sight in another room and I was asked to whistle. Three progressively higher whistles later a 'beep-beep-beep-beep' was heard and by whistling as I walked towards the sound source I quickly found my keys.

Testing, testing

The next few days were filled with playing with my new toy. It was called an 'Echo-chain' and as I wandered around our local hamlet, I noticed a range of these devices ranging in price from £1.50 to £2.50. The model purchased by her ladyship was a middle of the range job retailing at £1.90.

With the help of my daughter Kathryn, we tested the range of the Echo-chain across the Telford Towers courtyard. It reliably twittered when I whistled from 70 feet (a loud whistle) and with fresh batteries and low ambient noise, we attained 127 feet. The pitch of the whistle was somewhere around 1700Hz and each Echo-chain needed a slightly different pitch to make it warble. The keyring used two button-cell batteries, giving a total of three volts, at a current drain which indicated the life would be about a year of general use. The batteries are also replaceable.

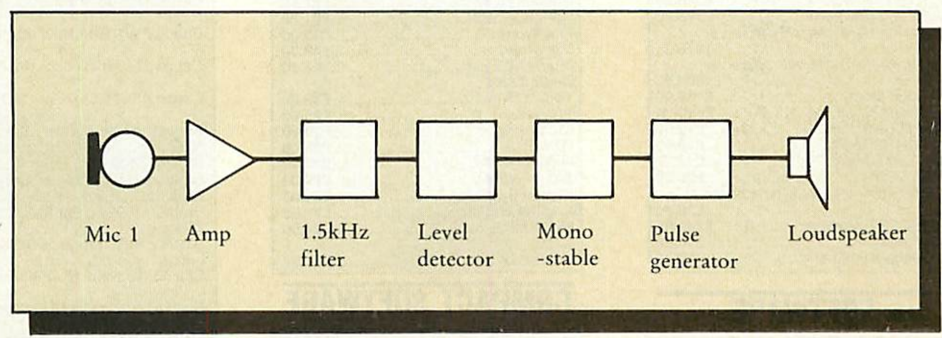


Figure 1. Echo-chain diagram

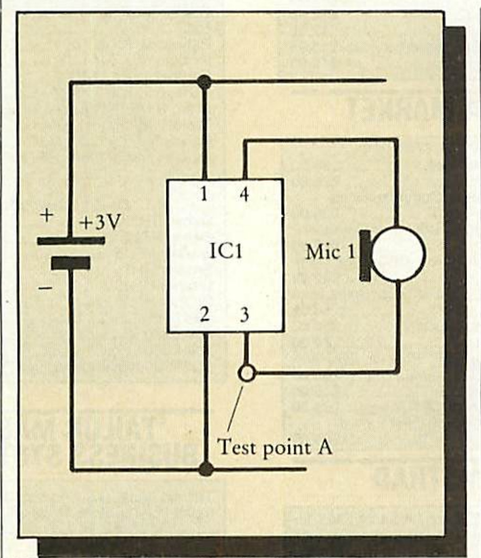
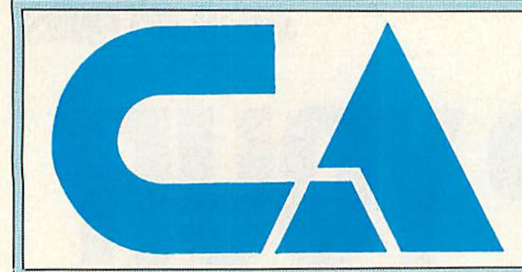


Figure 2. Actual circuit diagram

As the case was sealed, I could only guess at what might be within. Figure one shows a possible block diagram of how we could build such a device from separate components. Each block represents a group of components which we might call an electronic sub-system. The system works roughly as follows; the whistled tone is amplified and then passed through a filter. This filter is designed to cut out frequencies below about 1500Hz and above about 2000Hz, so only the signal from an accurately pitched whistle is able to pass through the filter. When through, the signal is converted to a direct current and if the level is high enough, a transister switch is activated. This switch fires a further time delay switch (called a monostable) and this in turn controls a pulse clock which switches on and off about 10 times in the space of two seconds. The pulses from this clock are fed to a bleeper which warbles as it receives each pulse.

Certainly building such a device from scratch would be costly, and would need a large number of parts. I decided that the risk of losing £1.90's worth of Echo-chain would be worthwhile and so I removed the batteries (via a simple slide out battery compartment) and began to prise open the case. Using a sharp knife, I gently eased the casing apart, beginning at the corner where the keychain was attached, and worked down the seam running around the case. The casing comes apart easily, but beware



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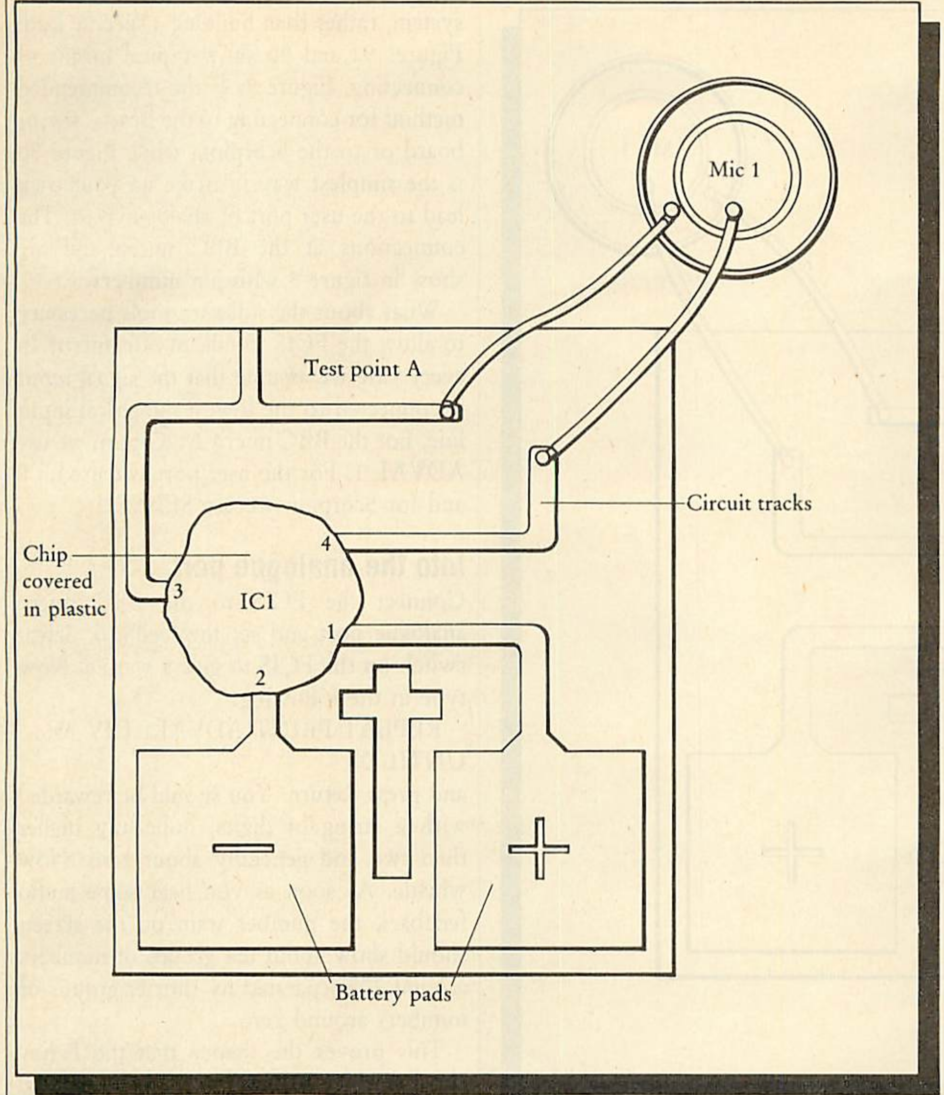


Figure 3. Circuit layout on printed circuit board (PCB)

of breaking two internal locating lugs, halfway down both the long sides of the keyring casing.

Inside there were only two items, a printed circuit board (PCB) with one component attached, and a 'piezo' type crystal which acted as a microphone and speaker. The majority of the PCB was taken up with a circular black blob, which covered a purpose built integrated circuit (IC).

Figure 2 shows the circuit diagram of the Echo-chain. The IC performs all the functions of the block diagram in Figure 1. 'Mic 1' is the piezo crystal.

Figure 3 shows the printed circuit board, which is only about 30mm by 30mm in size. The connection of the IC and wires is called 'surface soldering' and is quite a neat construction method. One circuit path from the IC to Mic 1 is clearly the output lead, and placing a test-meter probe on the join, labelled test point A, let's find out what happens in terms of changing voltage levels. To do this you need some help, because it will take two hands to use the test-meter, and a further two hands to replace the batteries correctly on their pads, then link them with the battery compartment back. This is necessary to complete the circuit.

The most logical test connection would be between pins three and four on the circuit diagram, and this gives a voltage reading of 1.5v rising to 2.25v once a whistle has triggered the chain. Testing further, test point A is found to be at the same voltage as the negative battery pad when quiet, but becomes about 0.75v higher when a whistle is detected.

It is reasonable to suppose that if we took a signal out to the BBC micro, instead of to Mic 1, then the BBC micro would be able to detect the whistle.

Figure 4 contains the necessary additions to the circuit diagram to make the Echo-chain interface. First the extras; a three-pin Molex PCB socket is used as a means of accessing the outside world. The middle pin of the socket is connected to test point A and the negative battery pad is connected to the lower pin of the socket. The upper pin is unconnected. No complex changes to the PCB are required.

Components

1. Echo-chain as described above, £1.90
2. A three-pin Molex PCB edge socket, costing 10 pence
3. Solder and wire

Total cost about £2

Readers can buy the PCB socket from high street electronics shops, or from one of the many electronics mail-order firms. The Echo-chain can be found in a wide range of electrical and gift shops.

Readers will need a fine pointed soldering iron. I use an Antex 15w iron with a 1/16th or finer tip. All soldering on the PCB should be done swiftly so as not to damage the IC. The stages are as follows:

- Open the Echo-chain as described previously and remove the batteries. If necessary remove the whole PCB from its slot. Remember to glue it back into place later.
- Place the three-pin Molex PCB connector on the outside of the casing between the switch and the bottom of the case. Mark three holes 0.1in apart and drill through the casing. The positioning is shown in figure 7.
- Cut the plastic mounting lugs off the Molex PCB socket and slide the three metal pins into the drilled holes. They should just protrude on the inside.
- Remove the socket and carefully solder about 3cms of fine wire (single core, or the stem from a ¼w resistor) to each of the bottom two pins. This must be soldered neatly, figure 6 will provide some help.

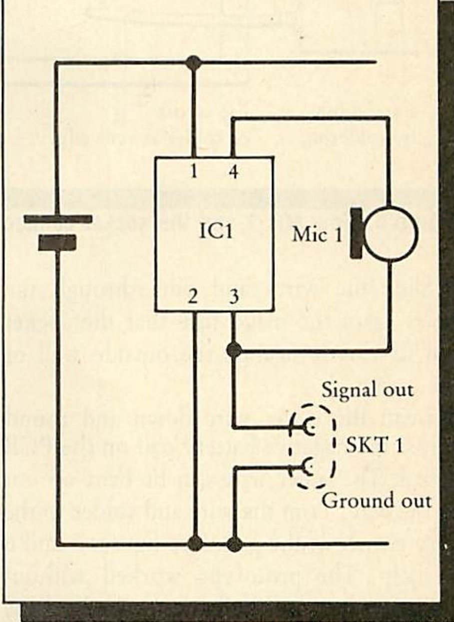


Figure 4. Additions to circuit to make FCIS

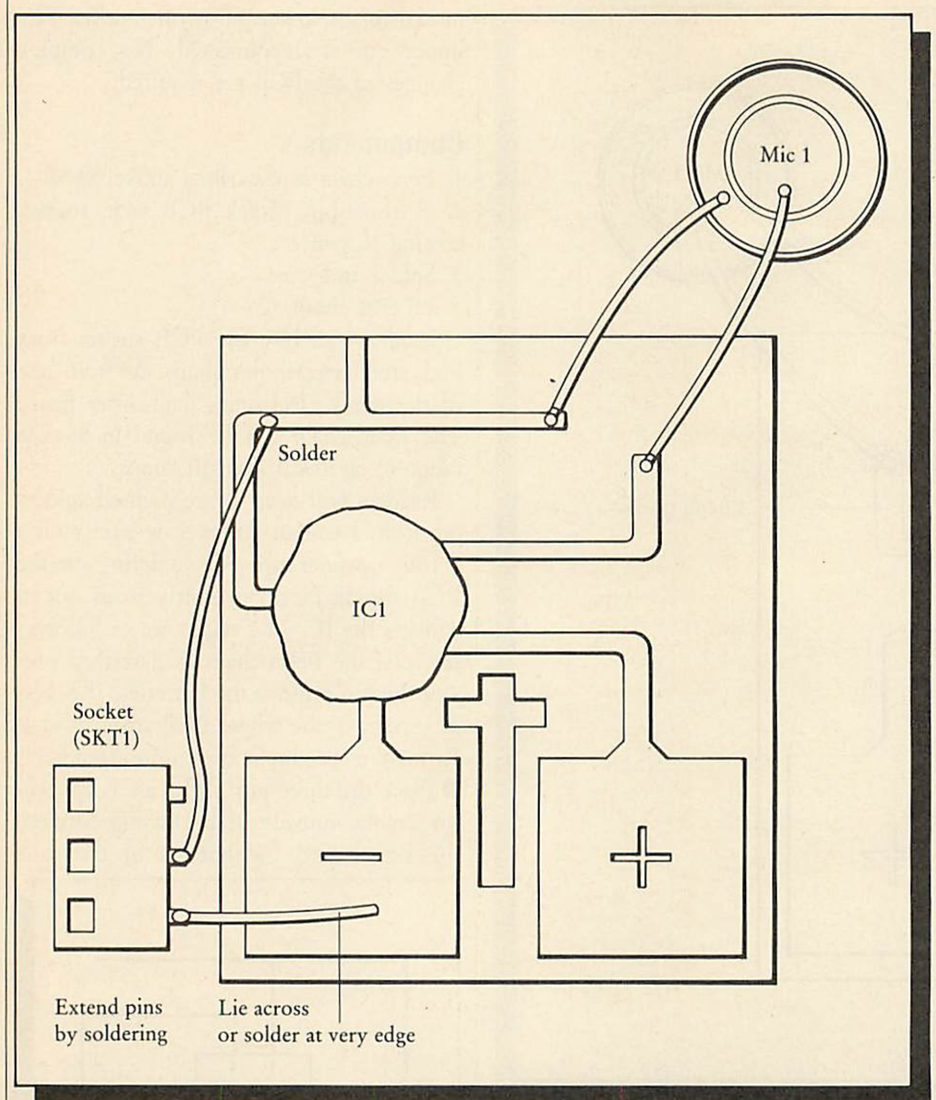


Figure 5. How Mic 1 and the socket connect to the PCB

- Slide the wires and pins through the holes again the make sure that the socket can fit closely against the outside wall of the casing.
- Bend the lower wire down and round across the negative battery pad on the PCB board. The other wire can be bent up out of the way. Trim the wire and solder to the very corner of the pad. Use figures 5 and 6 to help. The prototype worked without soldering because the batteries wedged the wire into place.
- Bend the remaining wire up and over the top pin, until it reaches the correct PCB track. Trim and solder it into place. Use figures 5 and 6 to help again.
- Make sure that neither of the wires on the socket are touching.

To test, place the batteries on their pads and join them with the battery holder back. Whistle and the device should warble. If the wires to the output socket are touching, then the Echo-chain won't warble. If the Echo-chain won't warble, then make sure your soldering has not joined any wires or you have not destroyed the IC by overheating and the batteries are correctly connected and linked via the battery holder back panel. Now, re-assemble the case, making sure that the chain is fitted at the top of the case.

From here we will call the completed device a 'Frequency Controlled Input Switch' (FCIS). The FCIS can be connected to almost any computer, and indeed I have driven Commodore, Spectrum, and RML computers using it. However, it was designed to work specifically with both the BBC range of computers and with the Scorpion intelligent control card.

Figures 8a, b and c show the three main ways of connecting the FCIS to these computers. Readers with all devices can choose the most appropriate, while those with Electrons or Compacts will probably go for figure 8b, the user port connection.

As the FCIS is a demonstration input device, it would be best to connect to the computer via a buffer board such as the Beasty sensor board or the DCP interface system, rather than building a specific lead. Figures 9a and 9b show typical means of connecting. Figure 9a is the recommended method for connecting to the Beasty sensor board or to the Scorpion, while Figure 9b is the simplest way to make up your own lead to the user port or analogue port. The connections at the BBC micro end are show in figure 8 with pin numbers.

What about the software tools necessary to allow the FCIS to talk to our micro? In every case we assume that the signal input is connected to the lowest numerical input line. For the BBC micro ADC port, we use ADVAL 1. For the user port, we use bit 0 and for Scorpion we use SENSE 1.

Into the analogue port

Connect the FCIS to the BBC micro analogue port and set the feedback defeat switch on the FCIS to give a warble. Now type in the following:

```
REPEAT PRINT ADVAL1 DIV 256:
UNTIL 0
```

and press Return. You should be rewarded with a string of digits, none any higher than two and generally about zero. Now whistle. As soon as you hear some audio feedback the number train on the screen should show about ten groups of numbers around 200 separated by shorter groups of numbers around zero.

This proves the theory that the Echo-chain warbles 10 times every two seconds.

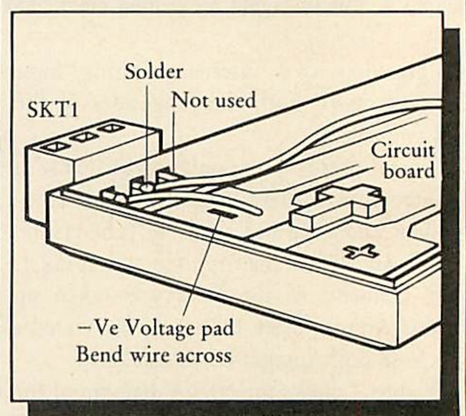


Figure 6. Connecting the interface socket

If you connect the 'wrong way round', ie, signal to ground the FCIS ground line to ADVAL1, the ADVAL reading will be a constant zero.

The next step is to find out how long the pulse train lasts for, so we can delay for that length of time before checking for another whistle:

```
10 REPEAT UNTIL (ADVAL 1 DIV 256) >100
20 TIME=0:REPEAT UNTIL TIME >200
```

```
30 FOR X/1 TO 10
40 PRINT ADVAL1 DIV 256
50 NEXT
60 END
```

This little routine waits for you to whistle and then waits two seconds, before printing the next 10 numbers from the analogue port. If all these numbers are regularly low, eg, under four, we can assume that the pulse train has finished. If some are over 100 allow more time. Increase the 200 in line 20 until all the numbers are low.

Using this information we can write a procedure to get the sound and another to wait for the correct delay:

```
1000 DEFPROCgetsound
1010 REPAT UNTIL (ADVAL 1 DIV
256) >100
```

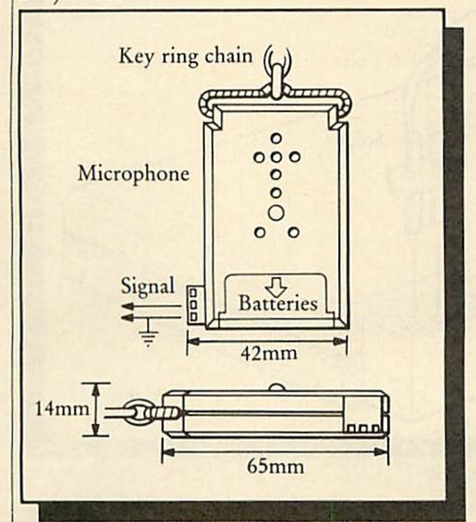


Figure 7. Completed FCIS, rear view

```
1020 ENDPROC
2000 DEFPROC waitforend(endtime)
2010 LOCALt:t=TIME+endtime
2020 REPEAT UNTIL TIME>t
2030 ENDPROC
```

And we can get a sound, wait for it to end, then do some processing:

```
100 PROCgetsound
110 PROCwaitforend(200)
120 do processing.
```

Two procedures rather than one are used because we might want to start processing before checking for the end of the sound:

```
100 PROCgetsound
110 now start a motor (for example)
120 PROCwaitforend(198)
```

The time delay is reduced because the processing takes a small amount of time. The 'end-time' parameter is the time value we measured using the previous routine.

Into the user port

On all Acorn micros from the Atom onward, there is a user port. The FCIS should work quite happily on any of these

Figure 8. Interfacing to analogue port (top), user port (middle) and Scorpion (bottom)

machines. First connect to bit zero of the user port and set the FCIS to warble when whistled at. Now type:

REPEAT PRINT 225–?&FE60:UNTIL 0

and press Return. If the train of numbers is steady at one and changes to zero when you whistle, all is well. If the train of numbers does not alter, then you have the signal-out line from the FCIS connected to the user port ground, and the FCIS ground line connected to the bit zero input. Reverse these connections and try again to see if it will work.

The next step is to find out how long the pulse train lasts for, so we can delay for that length of time before checking for another whistle:

```
10 REPEAT UNTIL (225–?&FE60)=0
20 TIME=0:REPEAT UNTIL TIME>200
30 FOR X=1 TO 10
40 PRINT 255–?&FE60
50 NEXT
60 END
```

This little routine will wait for you to whistle and then wait two seconds before printing the next 10 numbers from the user port. If all these numbers are ones, the pulse train has finished. If some are zeros, allow more time. As with the analogue method, increase the 200 in line 20 until all the numbers are zeros.

Now enter the aforementioned 'getsound' and 'endtime' procedures. From here we can progress just as we did using the analogue input.

Into the Scorpion

The Scorpion was covered in the last issue of *Acorn User*, and it seems set to become a standard addition to many control applications. Connect the FCIS to the Scorpion and using a BBC micro as a Scorpion terminal and type:

FOREVER PRINT SENSE 1

then press Return. If the readings fall between 10 and 20 and increase to over 100 when you whistle, all is well. If on the other hand the readings start at 1800 and fall slightly or don't move, then your connections are reversed. Reconnect and try again. To estimate the length of the pulse train type:

```
TO TIMER
   AWAIT SENSE 1 > 200
   WAIT 2000
   REPEAT 10 PRINT SENSE 1
END
```

Alter 'WAIT 2000' depending on the 10 numbers printed. If they are all over 1000 then increase the time value. If there are any numbers below 50 then decrease the time value.

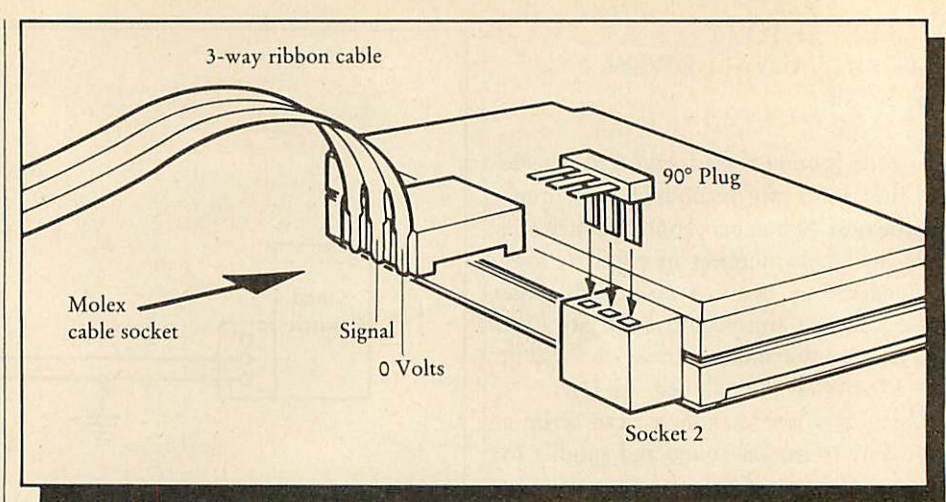


Figure 9a. Connecting via plug and socket

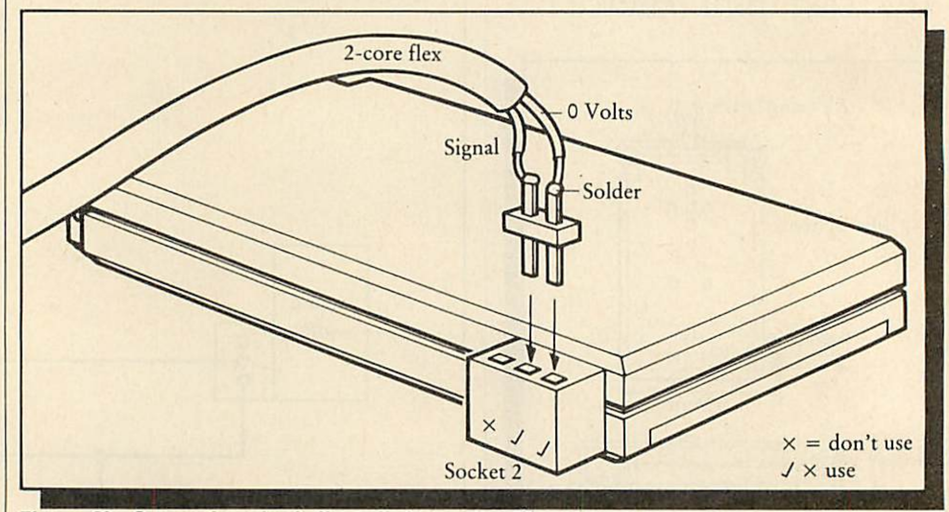


Figure 9b. Connecting via dedicated plug and cable

The 'getsound' procedure of Basic can be written as:

TO GETSOUND [AWAIT SENSE 1 > 200 END]

while the 'waitend' procedure becomes:

WAIT 1970

More complex whistles

We can use the 'getsound' procedure to wait for a whistle but a single whistle is of little value. We need to be able to whistle to start an activity and to whistle to stop one. A typical program might be:

```
10 REPEAT
20 REPEAT UNTIL (ADVAL1 DIV 256) > 100
30 PROCstartthing:PROCwaitend(200)
40 REPEAT UNTIL (ADVAL1 DIV 256) > 100
50 PROCstopthing:PROCwaitend(200)
60 UNTIL FALSE
```

For the user port replace lines 20 and 40 with the following:

REPEAT UNTIL 225–?&FE670 = 0

Users might like to solve this little problem:

● A program must be written, which continually turns a motor on after one whistle, reverses direction on two whistles and stops on a further single whistle. Any number of single and twin whistles are allowed to solve this.

Sensitivity

The FCIS is sensitive to a whistle over different distances depending on the interfacing method. Sensitivity can be doubled by turning off the audio warble with the built in slide switch. Sensitivity seems proportional to the load which the host micro represents across the signal lines. In indoor tests the following distances were measured using a self-generated whistle:

FCIS connected to:	Quiet whistle	Loud whistle
BBC user port	12ft	24ft
BBC ADC port	16ft	30ft
Scorpion ADC port	14ft	30ft

So there you go, a selective frequency sound switch which can drive any Acorn micro (and a few others) and in its spare time look after your keys. Talk about transformers!

A STITCH IN TIME

***Cross Stitch* is a computer aided design program which can be used to embroider patterns**

Anneke Sicherer-Roetman

My program to develop embroidery patterns was designed as a demonstration of computer aided design (CAD) for computer literacy courses for women and was very successful. There have been a number of painting systems in past issues of *Acorn User* such as *Freehand* in the October and November 1985 issues. The difference between such a painting system and a CAD system is that a painting system works upon the screen image itself, and this screen image, or a printer dump of it, is the end product.

A CAD system works upon data which represent an object, and the screen displays a representation of this data. The final product is not the screen image but a design.

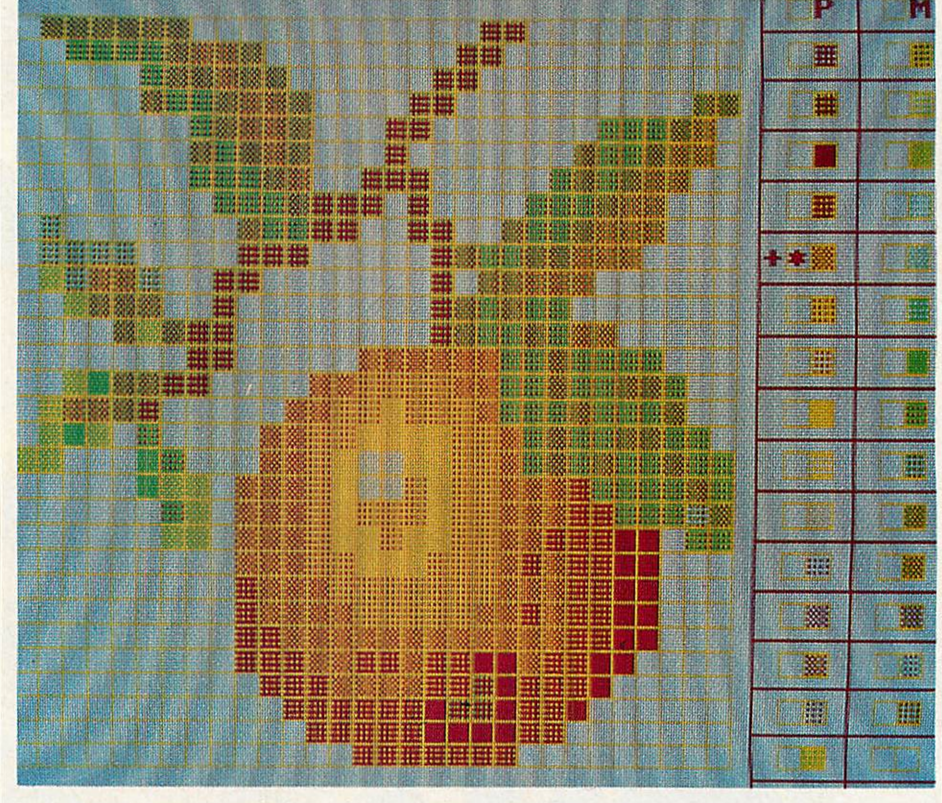
Cross Stitch is intended for use with a lightpen, but can also be used with a joystick or the cursor keys. It allows the user to design embroidery patterns by painting colours on the screen and it converts the resulting designs instantly to cross stitch embroidery patterns. In this program the data in memory can be represented on the screen either as little coloured squares or as embroidery symbols.

There are 30 colours and four palettes to choose from. Designs can be saved, loaded and dumped to a printer. A design takes up only 1k of memory. A display of colours used with the number of cross stitches per colour can also be displayed and printed out.

What you need

The program is very simple to use by just pointing at a spot on the screen with the lightpen and then pressing a switch. The only exception to this is the input of filenames and operating system commands via the keyboard.

The program works entirely in mode 1. It



This shows how the design of an apple embroidery pattern appears on screen

CROSS STITCH
Acorn User

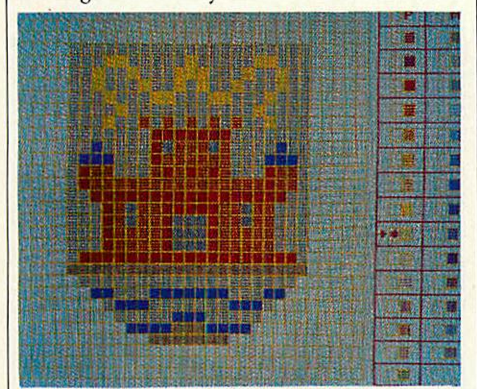
MENU
QUIT
DESIGN
LOAD
SAVE
PRINT
LEGEND
WIPE
OSCALL

rust	(42)
red	(23)
orange-red	(59)
orange	(74)
orange-yellow	(47)
yellow	(19)
cream	(4)
green-yellow	(1)
yellow-green	(13)
grass-green	(4)
brown-green	(78)
grey-green	(8)
moss-green	(64)
tan	(31)

The dumped pattern of the design above showing the legend of colours used

is written in Basic with a short machine code routine for fast colour mixing, and was tested on the BBC B micro and on the Electron. It should also work with the 6502 second processor, the BBC B+ and the Master computers.

Although the program will work with the cursor keys, it really comes into its own when using an analogue joystick or, better still, a lightpen, which means you need a Plus 1 if you use an Electron. The program was tested with the RH Electronics lightpen, and should also work with the Watford lightpen. If you will be using another make of lightpen, you may need to make the program changes detailed later. Another convenient input device would be a mouse, and mouse-owning readers may like to write their own procedures to handle this.



A crest created using Cross Stitch

Discs are not necessary, however, the program should always be run at PAGE=&1900. You must supply a suitable machine code and screen dump routine of your own. In the program listings, it is assumed that this loads in and executes at &900 and that it takes up no more than two pages of memory. Tape users could change this to &E00. A list of suitable programs is given at the end of the article.

Using the program

I've tried to make the program as self-explanatory as possible. When you run the program (type CHAIN "STITCH") you are first asked to enter your choice of input device. After that, the main program is started. You are presented with a blank grid and a menu on the right. I will call this the menu screen. If you are not using a lightpen a small cursor is visible somewhere on the screen. Lightpen users should adjust the brightness of the monitor so that a steady signal is generated by holding the pen a few centimetres away from a white area on the screen. Now choose any option by pointing at it, then press the lightpen switch, the fire button or the space bar respectively. By the way, if you are using the cursor keys, the cursor can be speeded up by simultaneously pressing Shift.

You can choose to load in a previous design (type in the filename) or start a fresh design. In the latter case you must choose 'wipe' to remove any previous design from the pattern memory and the screen.

No designing can be done on this menu screen. To make or alter a design, point at 'design', which draws the design screen in full colour with a menu on the right containing 30 colours plus the letters M and P. Choose a colour by pointing at it on the menu and then paint the colour in the desired spot on the grid, again by pointing at it. The chosen colour is indicated by an asterisk in the menu. By pointing at P you can switch between four palettes, and the used palette is saved with the design. This screen is only for designing purposes. For filing and printing, return to the menu screen by pointing at M. The design is then redrawn in embroidery pattern symbols. When you are satisfied with the design you have come up with, save it to disc or tape (type in the filename) and/or print it on paper.



Children's favourite toys and animals can be captured with this program

When you choose 'legend' on the menu screen, a list of used colours and symbols is displayed along with the number of cross stitches per colour. You can dump this to the printer by pointing at the desired option.

If you want to issue an operating system command (eg, to unlock a file) choose OSCALL and type in the command. You can leave the program by choosing 'quit'.

One final point. Lightpen users will find that it is virtually impossible to paint at a spot that is already red or black. Lightpens are rather insensitive towards the red end of the spectrum and, of course, black has no light at all and so there is nothing for the pen to 'see'. If you experience this difficulty, save the design, rerun the program, choose the joystick or cursor keys option and finish the design to your satisfaction. This will only be necessary if you make a painting mistake when using the colours red or black.

Entering the program

Cross Stitch consists of two parts. First type in "STITCH" (listing 1 on the yellow pages). It sets up the mode 1 screen, allows you to enter your choice of input device, loads in the machine code screen dump routines, defines the pattern symbols and assembles a short machine code colour mixing routine.

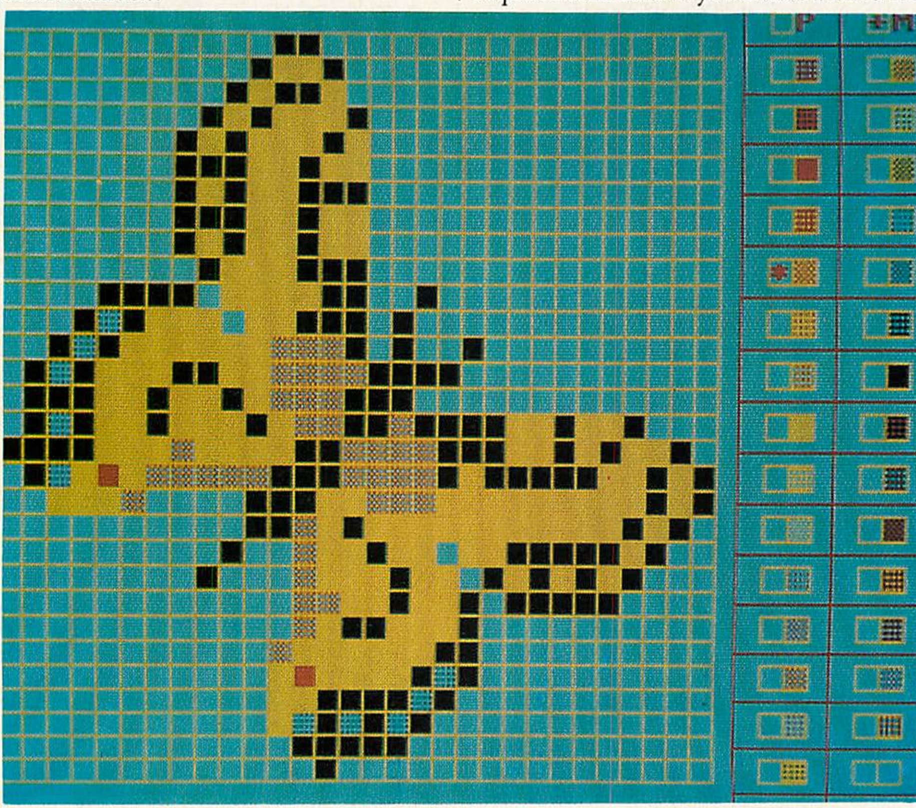
The pattern symbols are user-defined characters. Because more than 32 characters are needed, an extra page of character space is claimed in PROCinitialise by a *FX20,1 command. This would result in placing the extra characters at &1900, and PAGE would need to be raised to &1A00. This is overcome a few lines earlier by a *FX179 which forces the extra characters to reside at &1800. When using the advanced disc filing system (ADFS) this is not possible, however,

and you must delete line 430 in listing 1 and raise PAGE to &1A00 and change the value in line 2470. The main program, listing 2, should then be compacted further or shadow RAM used.

The Master does not need any extra space because the user defined character set is always fully blown, so lines 430 and 460 can, in fact, be deleted.

The rest of listing 1 consists of a machine code colour mixing routine and a table of the data it uses. The resulting code occupies less than one page of memory and is placed at &1300.

Save listing 1 before running it. It contains a checksum routine which will report any errors in the assembler listing or in any of the data statements.



Even something as complex as a butterfly can be built up quickly and easily

Listing 2 constitutes the main program. Save it as 'ST2'. In order to make it work on a 32k machine, I had to run it through a program compactor to remove spaces, THENs and the variables with NEXTs. Be sure not to type in any unnecessary spaces or the program won't run.

As printed, the program works with an analogue left-hand joystick. For a right-hand joystick change line 1960 to:

x%=39–ADVAL3DIV1638

and line 1970 to:

y%=31–ADVAL4DIV2048

Switched type joysticks will not work.

The program works for the RH Electronics and Watford lightpens. To adapt it for the Robin Professional lightpen and the Datapen change line 1920 to:

UNTIL ADVAL0AND3=1

For the Stack lightpen alter line 1920 to:

UNTIL ADVAL0AND3=0

The Robin standard, Minor Miracles, Beebug and *Micro User* lightpens have no switch. You can make the space bar act like a switch by changing line 1920 to:

UNTIL INKEY(–99)

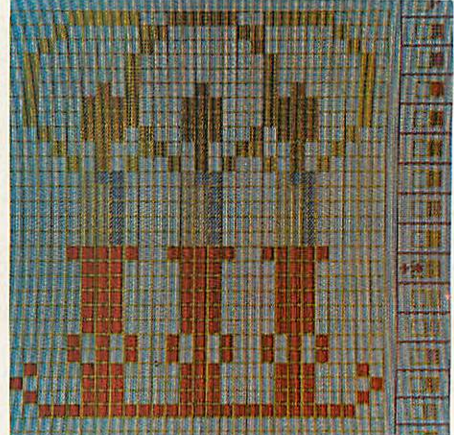
As mentioned earlier, a suitable machine code screen dump called SDUMP should be saved on disc or tape after STITCH. A list of those presented in *Acorn User* is given in the table on page 93. If you have a printer dump ROM such as *User Dump* or *Printmaster*, then line 490 should be edited to contain the required command. If you do not wish to use the printer dump routine, then simply replace line 490 with a REM and do not choose the print option.

You can test the program using the cursor keys so that you can be sure that any strange behaviour is not caused by an external hardware problem.

Listing 3 is a file creator. Type it in, save it and run it. Two sample designs are then automatically saved to disc or tape in *Cross Stitch* format. You can load these into the *Cross Stitch* program like any other design. As with STITCH, page must be set to &1900 to use CREATOR.

The program is written in a completely modular fashion. A list of all variables and procedures is given in table 1. Lines 50 to 100 are the main program. PROCinit initialises, among other things, the palette and the pattern memory. After that a loop is entered which calls PROCpattern and PROCdesign in turn, until the user decides to quit. PROCpattern takes care of the pattern screen and all menu input, and PROCdesign handles the actual designing. The error trap, which is set up at line 40, will report the error (at line 2340) and allow you to continue the program with no harm done.

The whole program is concerned with the transformation of screen co-ordinates (values of x% and y%) into choices (values of C%), and acting upon these. All requests for this co-ordinate information go through the procedure PROCcoords. Depending



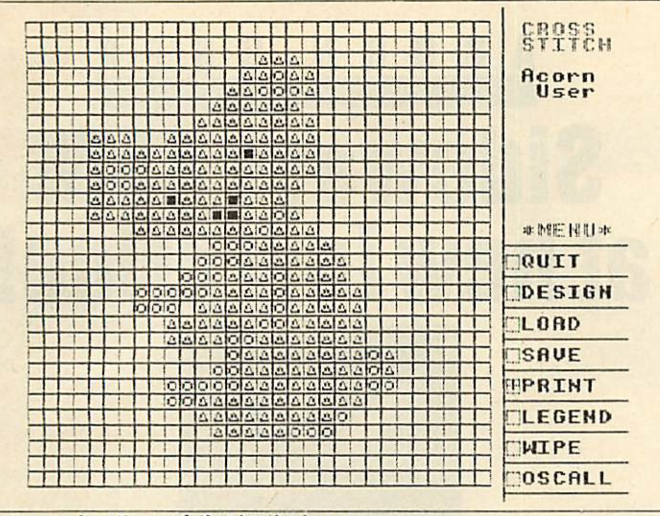
A Christmas design with three candles

upon M%, which is set in STITCH and holds the number of the chosen input device, this procedure then calls PROCpen, PROCstick, or PROCkeys respectively. These return with the determined text co-ordinates in x% and y%. An extra PROCmouse could be incorporated here. The only requirement is that it, too, returns with legal text co-ordinates in x% and y%.

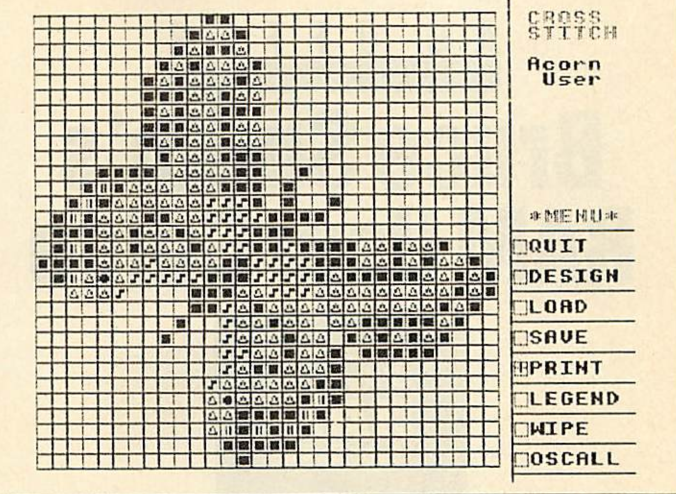
Storing and drawing designs

The program works in mode 1 to give a satisfactory resolution. The restriction to four colours is partly overcome by mixing. The colour patterns are based on a two by two pixel grid (super pixel). Each element of this block can be set to colours zero, one, two or three. The information for the different patterns is stored in the data statements in listing 1. Each set of four colour values used for one super pixel is encoded into one byte. These bytes are put in a memory colour table. They can be thought of as being consecutively numbered from zero to 29, corresponding to the 30 colours which are available.

The pattern memory is at &1400-&1784.



A dumped pattern of the koala bear

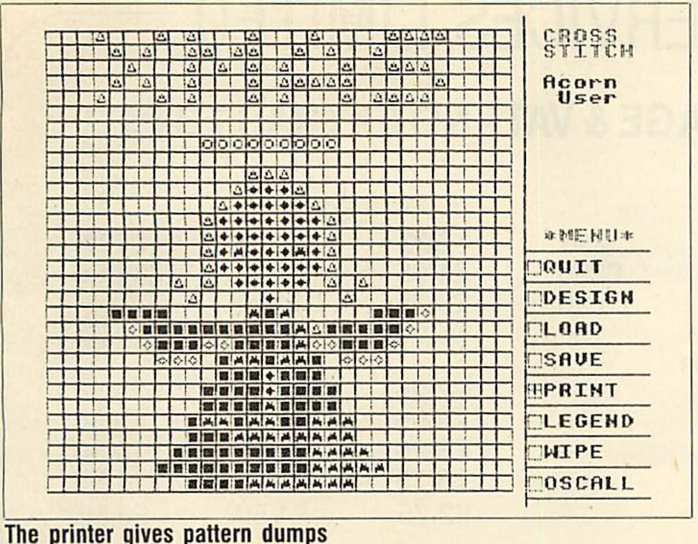


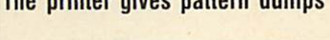
The butterfly pattern; the main menu is on the right

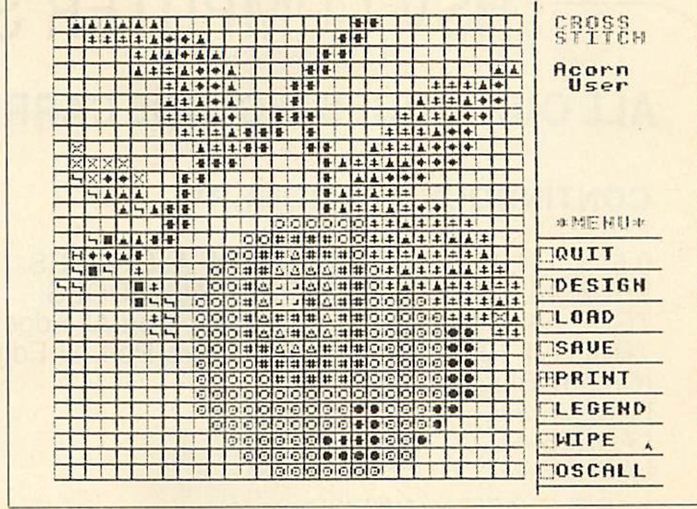
VARIABLES AND PROCEDURES IN THE MAIN PROGRAM

Variables	
A%	accumulator for OSBYTE call
V%	holds menu choice number
H%, J%,	loop counters
JJ%, J%	"
M%	holds input device number (1=lightpen, 2=joystick, 3=cursor keys)
R%, r%	result of OSBYTE call
X%, Y%	X and Y registers for OSBYTE call
c0%, c3%	hold actual colour numbers for logical colour numbers 0 and 3
c1%, k%	colour at specific location
col%	current designing colour
com%	address of command line for OSCLI call
count%	address of colour counters (for legend)
mix%	address of colour mixing routine
ox%, oy%	previous x and y co-ordinates
pat%	address of pattern memory
step%	speed of cursor when using keys
vdu%	address of palette number
x%, y%	current x and y co-ordinates
xx%, yy%	local co-ordinates
a$, c$, in$	parts of command line
name$	filename to be loaded or saved
r$, ss$	squares
w$	input string

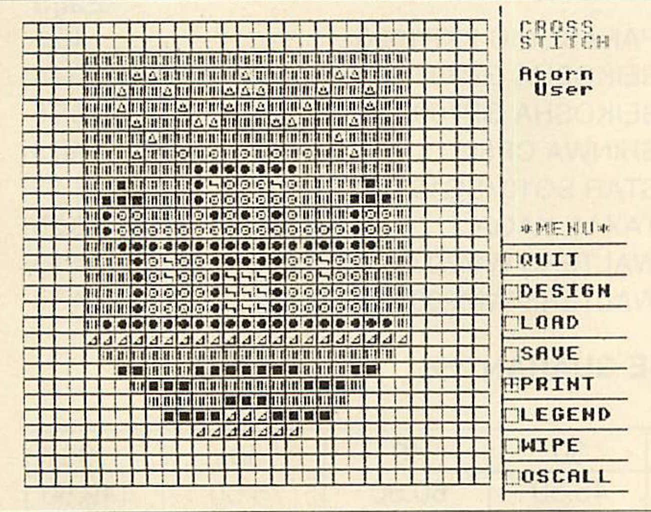
Procedures	
coords	directs call for co-ordinate information to different input procedures
design	design routine
init	initialises addresses, strings, pattern memory, palette number and cursor co-ordinates
keys	handles movement via cursor keys (combined with Shift) until the space bar is pressed
legenda	displays legend on screen. It uses the relevant set of DATA statements, depending on ?vdu%
mainD	handles input in PROCdesign. Depending on the x co-ordinate it calls either PROCselectD or PROCpaint
mainP	handles menu input in PROCpattern
menuD	draws menu of colours on design screen
menuP	draws menu of options on menu (pattern) screen
mvcr	moves cursor by erasing and redrawing
osdfs	performs operating system calls (also for saving and loading)
paint	fills byte in pattern memory with current colour number and draws square at desired spot in current colour
pattern	main menu routine
pen	lightpen handler, obtains co-ordinate information from 6845 CRT chip via OSBYTE calls until the switch is pressed
prcr	prints cursor if no lightpen
print	calls resident machine code screen dump routine
printcol	prints an * in front of chosen colour in colour menu
screenD	draws design screen
screen P	draws menu (pattern) screen and counts the number of occurrences per colour
selectD	transforms screen co-ordinates into colour selections
selectP	transforms screen co-ordinates into actions
stick	joystick handler, obtains information by ADVAL function calls until fire button is pressed
vdu	sets correct palette depending on ?vdu%
wipe	clears pattern memory.




The printer gives pattern dumps



Embroider the pattern from these dumps



The legend option lists the materials needed

It is possible to return to 'design' for another attempt

Here 900 bytes are stored that represent the colour at each spot in the 30 by 30 grid by a number ranging from zero to 29. During the drawing of the coloured design screen (PROCscreenD) each colour number is handed over to the machine code colour mixing routine. This extracts the corresponding colour data from the colour table and prints four differently coloured dotted characters (numbers 160 to 163) on top of each other. When the black and white pattern screen is drawn (PROCscreenP), each colour number in the pattern memory is added to 128 to display the corresponding pattern symbol character. The user can choose between four different palettes. The palette number is stored at &1790 and is saved along with the design itself. If you wish to save or load a design, memory from &1400 to &1800 (1k) is saved or loaded by the *SAVE and *LOAD commands. This has speed advantages when using discs. Moreover, as memory is at a premium, no space is necessary for file buffers, as would be the case with OPENOUT/OPENIN.

DUMP ROUTINES

Dumps can be used with this program. Line 490 in listing 1 should be modified to load your routine at &900, or to call the dump routine if it is in ROM.

	Issue	Page
Canon PJ1080A	Jul 84	XIV
Centronics 737/9	Sep 84	127
Centronics 739	Aug 83	67, 101
Daisywheel printers	Jun 84	146
Epson-compatibles	Jan 86	48
Epson printers	Mar 84	45
Epson JX70	Oct 85	167
Fastext 80	Mar 85	167
Juki 6100	Jan 84	130
Olivetti Spark-jet	Aug 83	65, 72
Sanpoke printer	Jun 84	146
Seikosha AP100	Aug 83	22, 72
Seikosha AP100	Sep 83	61
Seikosha GP250	Apr 84	174
Seikosha GP250	June 84	II
Star printers	Mar 84	34
Tandy CGP115 plotter	Aug 83	85

Menu commands summary

Quit leaves program and returns back to the Basic prompt
Design switches to the colour embriodery design screen
Load requests a previously saved screen filename which is then loaded back into *Cross Stitch* for editting.
Save requests a filename under which the current design will be saved.
Print dumps the current screen content to printer.
Legend provides a key to the meaning of symbols in the current design, this may then be printed out if you desire.
Wipe clears the current design from memory
OSCALL allows you to enter a star command.

Turn to page 113 on the yellow pages for details of where to find the Cross Stitch listings and how to enter them.

The monthly disc and tape also contain the listing plus extra sample designs and an Epson compatible SDUMP machine code program.

IT'S ALL GREEK

By using the Pythagoras theorem, you can create complex tree type graphics and learn about mathematical principles as well

Albert Koelmans

Pythagoras, the mathematician, philosopher and teacher lived in Greece some 2500 years ago. He taught his many followers a strange mixture of philosophy, religion and mathematics based upon the theory of the whole numbers. Today, he is best known for his theorem . . . in any right angled triangle the sum of the areas of the squares on the two short sides is equal to the area of the square on the long side, the hypotenuse.

During the Second World War a Dutch engineer, Bosman, was forced by the Nazis to work on U-boat design. Resenting being forced labour, he resolved to work as slowly as possible.

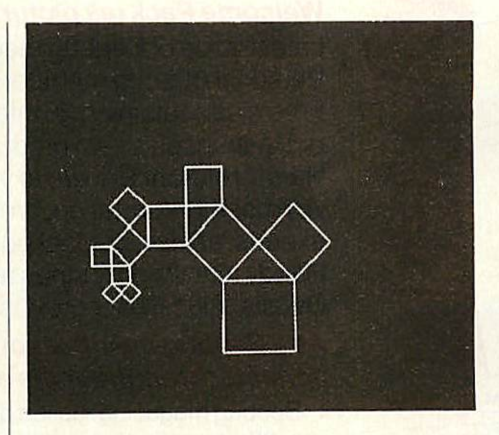
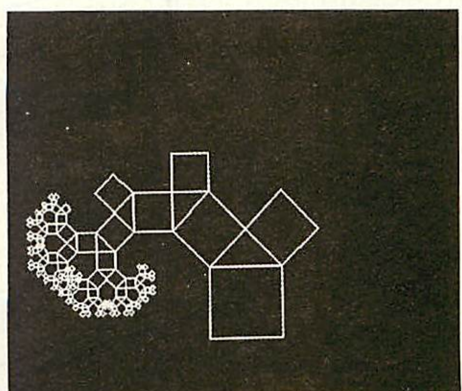
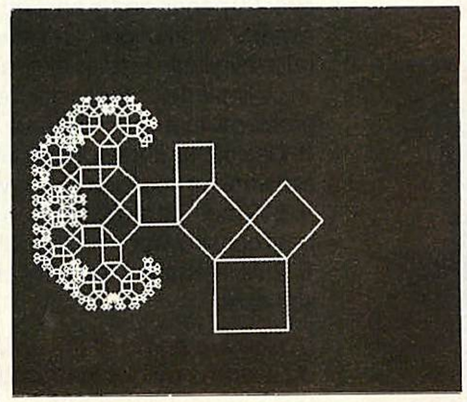
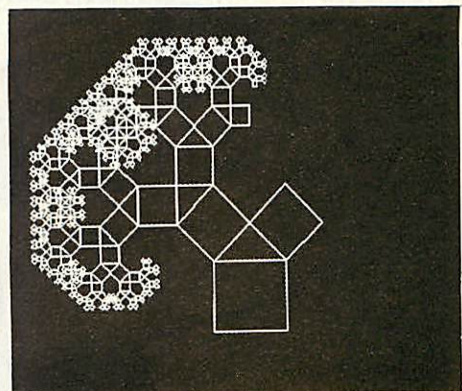
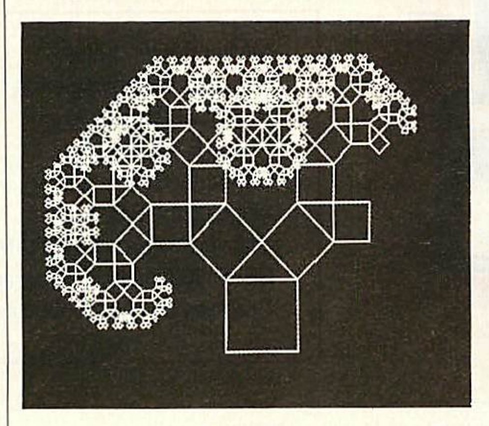
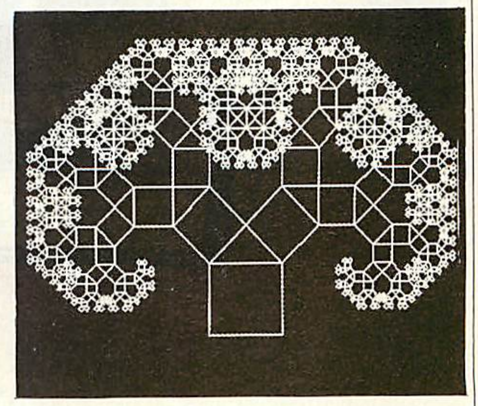
One morning, while considering the Pythagoras theorem, he wondered; what would happen if he drew a new triangle on top of each of the two squares, and then new squares on top of these triangles and so on?

All that was available in those days was a pencil, a ruler and a large piece of paper. He started drawing the squares and triangles and the U-boat never got finished. However, the Tree of Pythagoras, as it became known, did. It is this Tree of Pythagoras and its many derivatives which forms the subject of this article.

Bosman's tree

Bosman's tree is illustrated on this page, and it is of interest for many reasons. First, it demonstrates that it is possible, with the aid of some simple geometric equations, to generate interesting pictures. Second, if we can write a general program to draw the tree, we can begin experimenting with small changes to the program. Third, we can learn something about programming; the tree can be easily built by using a powerful programming feature which is supported by the BBC Basic language, namely the recursive procedure.

Look at the tree, you will notice each

The Tree of Pythagoras, invented by Dutch engineer Bosman, was created by placing an isosceles triangle on top of a base square. Two further squares are added to that triangle and so on to build the tree. Bosman used only pencil and paper, but the tree can easily be drawn using a recursive programming procedure. The computer lets us experiment without endless pencil and ruler work

constituent is similar to the tree as a whole, only smaller. We can therefore draw the whole tree by calling a procedure which plots a few lines on screen and then calls itself recursively to produce the remainder. The resulting procedure will be small and elegant, and can be used to produce a wide range of interesting graphics. Finally, it can be used as a benchmark to test the accuracy and versatility of graphic devices, particularly plotters and printers.

Bosman chose an isosceles triangle ie, two of its sides were equal in length. We are going to be more general and permit triangles of any shape as long as the top angle is 90 degrees. This leads to the following problem (figure 4): what are the co-ordinates of point Z when angle 'a' is any angle between zero and 90 degrees? This problem is solved in three steps. First, have a look at Bosman's tree, where the whole triangle has been moved to the origin and has its base along the X axis. We see that:

SIN(a)=OA/OC=OA/x, so:
OA=x*SIN(a)

because angle OAB is equal to 'a', we have:

OB=OA*SIN(a) = x*SIN(a)*SIN(a)

and consequently:

AB=OA*COS(a) = x*SIN(a)COS(a)

So we have found the co-ordinates of the point A.

Now look at figure 3 in which the whole of figure 2 has been rotated over an angle, 'b'. There is a simple formula for the new co-ordinates (v',w') of a point (v,w) when rotated over an angle, 'b', with respect to the origin:

v' = V*COS(b) – W*SIN (b)
w' = V*SIN(b) + W*COS (b)

If we insert the co-ordinates of point A into this formula we get the co-ordinates of point Y in figure 3:

X co-ordinate:
x*SIN(a)*SIN(a)*COS(b) –
x*SIN(a)*COS(a)*SIN(b) =
x*SIN(a)*(SIN(a)*COS(b) –
COS (a)*SIN(b)) =
x*SIN(a)*SIN(a-b)

Y co-ordinate:
x*SIN(a)*SIN(a)*SIN(b)+
x*SIN(a)*COS(a)*COS(b) =
x*SIN(a)*(SIN(a)*SIN(b) +
COS(a)*COS(b)) =
x*SIN(a)*COS(a–b)

where x equals the length of:

OZ = SQR(v*v + w*w)

according to Pythagoras, and b is determined by:

TAN(b) = w/y

Finally, if we move the whole thing so the point that began at the origin moves to a point (a1,b1) (see figure 4 again), we just add a1 to the X co-ordinates and b1 to the Y co-ordinates. Bear in mind that v now equals c1–a1 and w equals d1-b1. This is the general formula for the co-ordinates of point Z in figure 4:

X co-ordinate:
SQR (v*v+w*w)*SIN(a)*SIN(a-b)

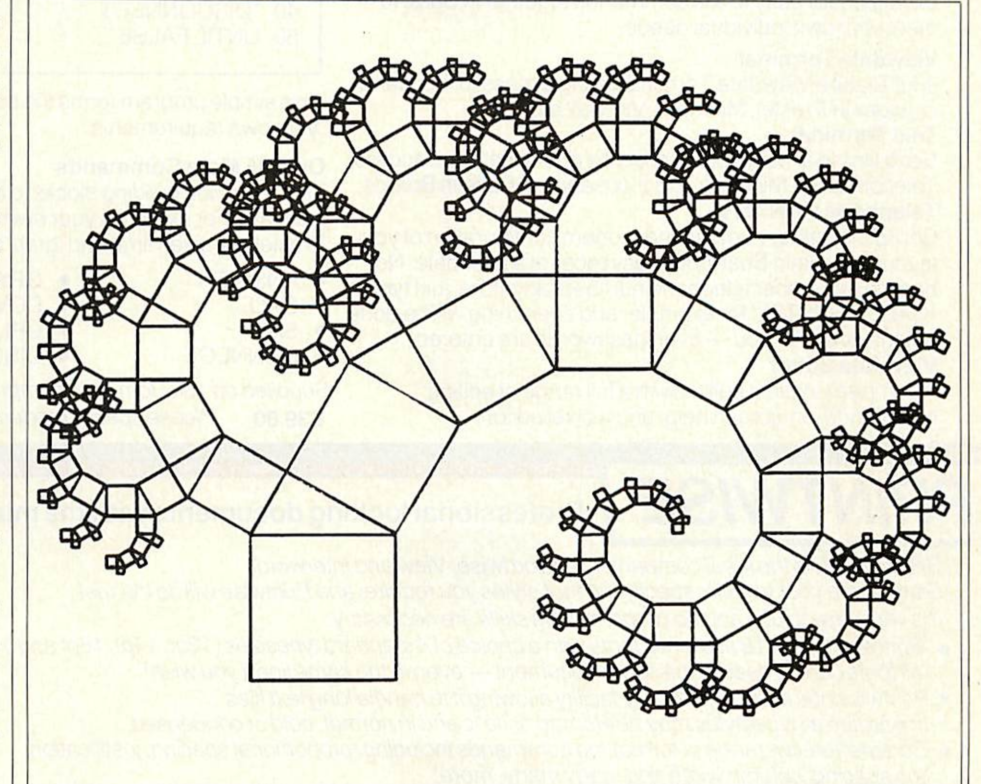
Y co-ordinate:
SQR (v*v+w*w)*SIN(a)*COS(a-b)

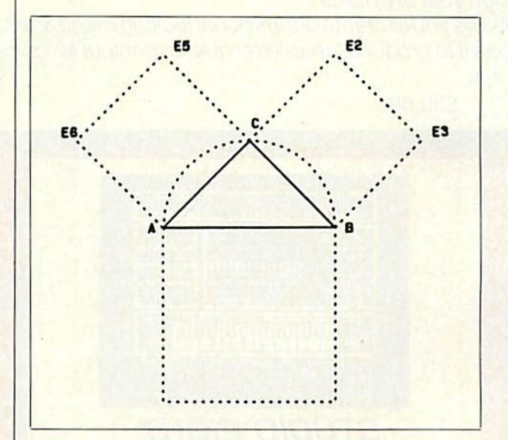
where: v=c1–a1, w=d1-b1 and TAN(b)=w/v.

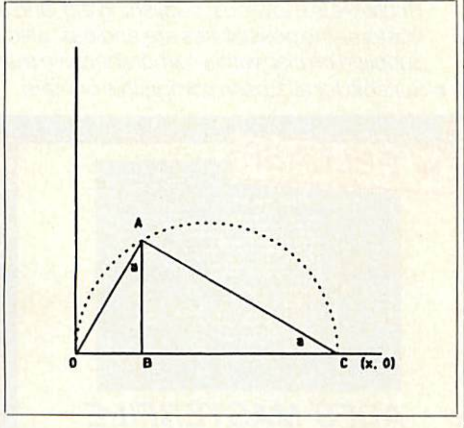
The program

Now let's have a look at the program (listing 1 on the yellow pages). The main program uses the following variables; M% is the X co-ordinate for the middle of the tree 'trunk' and H% is the Y co-ordinate for the middle of the trunk. L% is half the trunk length and 'a' is the angle a in the formulae above.

M% and H% are used to position the tree on the screen, while L% controls the size. By using all three together, you can effectively zoom in on any part of the tree.







By changing just a few variables in the root formula, totally different trees can be created. The dump above was created by changing angle 'a' to 30 degrees. The resulting tree curls in a spiral to the right. Each square is at 30 degrees to the last: compare with Bosman's original, which used 45 degrees. Here also the first square has been moved. Below right, figure 1 and below left, figure 2

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```
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20 *ANSWER
30 *SAY "No news is good news!"
40 *DISCONNECT
50 UNTIL FALSE
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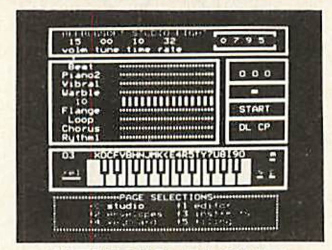
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See Beebug's full mail order price list, elsewhere in this issue.

Lines 80 to 100 draw the trunk and the call to the procedure 'tree' (line 110) produced the remainder. The function 'lngth' (lines 140 to 160) returns the length of the line segment between the points, with co-ordinates (a,b) and (c,d) using our central tenet: Pythagoras's theorem.

The function 'angle' (lines 180 to 220) returns the angle b which satisfies the equation TAN(b)=y/x. The workhorse of the program, the procedure 'tree' (line 250 onwards) has six parameters and together they form the co-ordinates of three points, C1, C2 and C3. The X co-ordinate of C1 is c11, c12 is the Y co-ordinate and so on. The same convention applies to the local variables. These three points are the corners of a triangle with C1C2 as its base, and the angle at C3 as the right angle. They are in fact equivalent to points A, B and C in figure 1. Let's now continue to look at Figure 1 bearing in mind the co-ordinates of point A are c1, c2 and so on.

If, in the rotation formulae above, we take b to equal 90 degrees, we then see the point (v,w) ends up in (−w,v). This is used in lines 280 to 330, which calculate the co-ordinates of points E2, E3, E5 and E6. For example, point E2 can be found by rotating the line segment CB 90 degrees anti-clockwise. To find the co-ordinates of E2, we must add −1 *(Y co-ordinate of B−Y co-ordinate of C) to the X co-ordinate of C and (X co-ordinate ob B−X co-ordinate C) to the Y co-ordinate of C. Lines 340 to 360 then draw the triangle and the two squares by connecting the points A, E2, E3, B, E5, E6 and A. Line 370 makes line segment E6E5 the base of a new triangle. Lines 380 to 440 calculate a new C3 following the formulae above, and then the procedure 'tree' is called recursively with the co-ordinates of the new triangle as the new parameters.

Different tree species

If 'a' is equal to 45 degrees, the program produces Bosman's tree but with the aid of computers we can achieve things Bosman could only have dreamt of. Just by changing a few variables a whole new tree can be produced. First change line 20 to the one shown in listing 2, it sets 'a' to 30 degrees. The resulting is shown on the previous page; as you see the whole tree curls round in a spiral to the left.

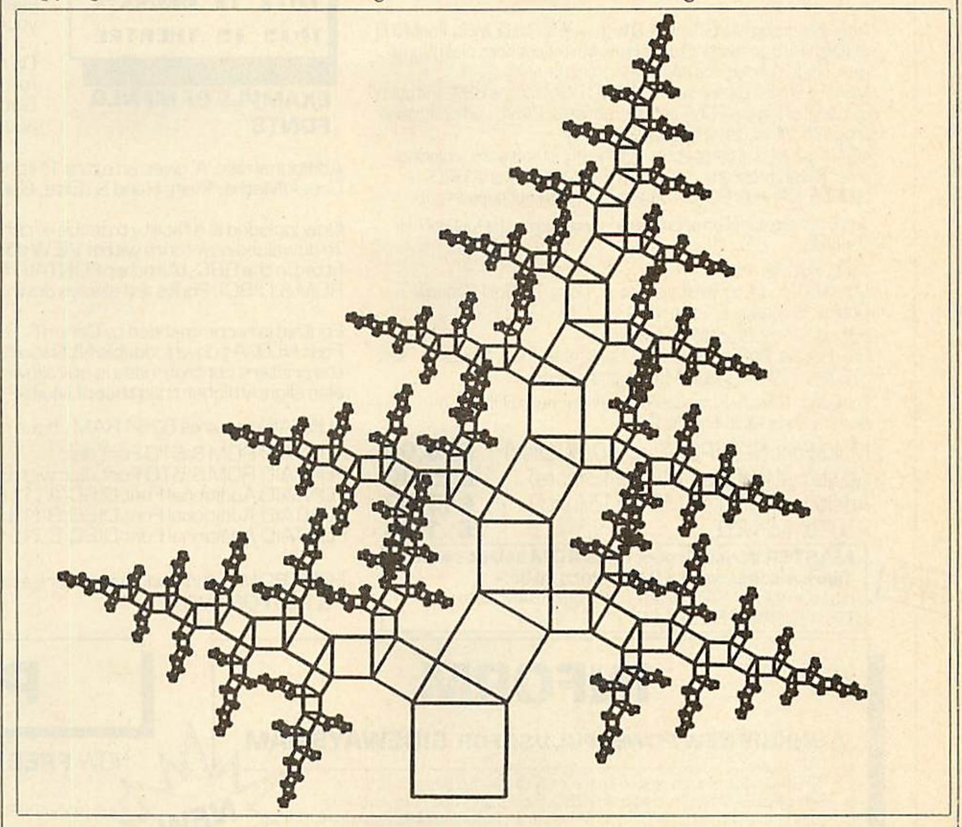
Now try setting 'a' to 30 and 60 degrees alternately. To do this we had to add an extra parameter to the tree procedure; an integer m%, which is imcremented every time 'tree' is called. The important line is now line 400. The result is shown in the screen dump opposite and looks rather like a fir tree.

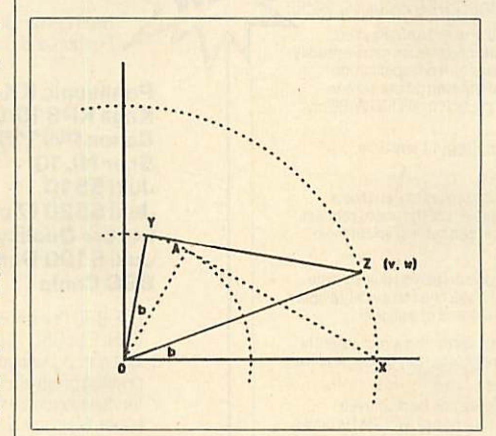
The program offers endless possibilities for experimenting. For example, what if we change 'a' only if m% mod 3=0, or what will the result be if we switch back and forth between different kinds of trees? Some of the trees will look more like bushes, others will spread their branches along the ground or will appear unstructured, filling the screen like ivy. Or try copying line 350 to 485 and change both.

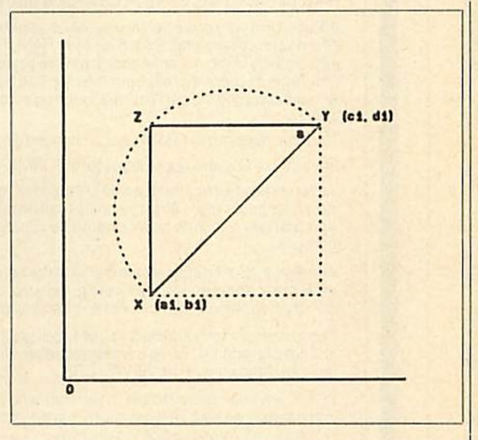
An obvious source of experimentation is adding colour. This is exactly what a Japanese artist, Yoichiro Kawaguchi has been doing. Some spectacular examples of his work can be found in the book *Computer Images: State of the Art.*

Reference: *Pythagoras Festival, published by Wolters Noordhoff BV, Groningen, the Netherlands, 1970 (in Dutch)*

Turn to the yellow page index for more details of the Pythagorean tree listings and how to enter them. The programs are on this month's listings cassette/disc.







The fir tree pattern above represents another extension of Bosman's original experimentation with the Pythagorean rule. The dump was created by setting the angle 'a' first to 30 degrees and then to 60 degrees and alternating them as the tree is built up. This is the simplest of an infinite range of possible experiments. So keep playing. Below right, figure 3 and below left, figure 4

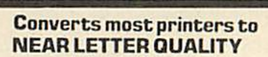
3½" 'COMPACT' versions of CJE software available £2 extra.

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For Canon & Taxan Kaga users we recommend FONTAID in preference to Multi-Font NLQ.

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EXAMPLE OF MFNLQ FONTS

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Now included is a facility to issue '*' commands within a VIEW document.
To download new fonts within VIEW documents, the FONTAID ROM needs to be fitted in the BBC. (All other FONTAID facilities are available on both the FONTAID ROM & DISC). Fonts are always downloaded from Disc.

Fontaid is recommended to Canon & Taxan Kaga owners in preference to Multi-Font NLQ. As downloadable NLQ is a built-in facility of the Printer, full access to all the printers control codes is still allowed. The resolution of the FONTAID NLQ is also slightly higher than that of Multi-Font NLQ.

FONTAID requires 6264 RAM chip in printer.

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In fact, any information to which you frequently refer can be displayed immediately without running another program. Your use of INFORM is only limited by your imagination, as they say!
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JUMP FOR JOY

The Master Compact has a joystick port compatible with many other computers and their associated accessories

David Atherton

An important feature of the Master Compact is the joystick port which is compatible with many other computers, particularly the Atari range, the Commodore 64 and the Amstrad. This means that Compact owners can use any of the vast range of joysticks marketed for these machines, without the need for any kind of special plug or interface. The BBC model B micro, Electron and even the Master 128 have a different interface, and consequently a much narrower range of joysticks.

The previous Acorn joystick interface was known as a proportional or analogue interface, and was designed more for control equipment than for joysticks. The best analogy is that the old system was like a light dimmer control, in that that can have many different settings. The new system is like an ordinary light switch. It can only be on or off. In fact there are four switches; left, right, up and down. When designing the Compact, Acorn wanted to use the Atari/Commodore standard, but they also wanted to make the Compact work with software written for the old joystick system. Acorn achieved this by including extra routines in the operating system which emulate the old system.

There are two new commands in the Compact, which you should know about if using joysticks. Typing *CONFIGURE PROPORTIONAL will make joysticks work in the same manner as the model B micro. *CONFIGURE SWITCHED will also make them function like the model B but with just three settings, left/centre/right and up/centre/down. In general you should use the switched command unless the program doesn't seem to work properly, in which case use the proportional command. After typing this command, press CTRL-Break, and then load your software. Games will require 'switched', and drawing packages, 'proportional'.

Some Compact games do not contain joystick options and others do not respond very quickly, even when a switched setting is used. For these we have written a 'key emulator'. This program can be loaded before running a game, or any other program, and the joystick will represent up to five keys.



The Digimouse is the only Compact compatible mouse available

Type in the program from the yellow pages, save it on disc, then chain it. You will be asked to press the keys for fire, right, down, up and left. Do this by holding the key down for about a second and then releasing it. The settings should match the keyboard controls of the program you are about to run. When the message appears, press CTRL-Break and then run your program. The settings will remain active until you re-run the program, or switch off the machine.

I tested the emulator on the new Superior/Acornsoft games collection for the Master Compact. Out of eight games, three didn't have joystick options (*Meteors*, *Planetoid* and *Magic Mushrooms*) and do now. However, two (*Starship Command* and *Labyrinth*) wouldn't work with the emulator. Nevertheless, it should be useful for quite a few programs. Remember, when using the emulator, you must press the keyboard option on the game, not the joystick options.

Joystick comparisons

For this review I didn't use the usual tried and trusted method of getting things sent free from the manufacturers – I actually went round the shops to see the joysticks available. I avoided computer dealers, and tried Dixons, Boots, Woolworths, John Menzies and so on. I also had a look on Tottenham Court Road in the West End of London, which is supposed to be the centre of electronics retailing in the capital. As a result, some of the joysticks are newer than others.

Dixons, surprisingly, didn't have any joysticks for sale at all. The ones on display in the window are part of complete computer packages. No luck either at Woolworths, Rumbelows, and Currys.

The branch of John Menzies I tried had four joysticks; the Amstrad JY-1 and JY-2, the Quickshot II, and the Kempston Pro 5000. W H Smith had a different selection, the Moonraker, Quickshot II, and the Cheetah Mach I. Laskys had quite a large selection at their Tottenham Court Road branch, but outside the centre of London, the choice was restricted. Another disappointing shop was Tandy. All the shop stocked was two Amstrad models, and an ancient-looking £9.95 product for the Tandy colour computer which was basic and doesn't even have auto-centring.

If you base popularity on the number of shops carrying a particular product, then by far the most popular joystick is the Spectravideo Quickshot II. I found it on sale virtually everywhere. It's a reasonable unit, with twin fire buttons on the handle, auto-fire and suction cups, but no micro-switches or base-mounted buttons. Your local high street or shopping centre will certainly have this model.

When using joysticks, skill in the game generally counts for a lot more than the

PHOTOGRAPHS BY DAVE KING

quality of the joystick itself. Nevertheless, some units are a lot easier to use than others, and certainly some have more features, and offer better value for money. All the joysticks I have reviewed here function well, you don't get as much rubbish in joysticks as you do with software.

The best stick I tried was the Cheetah Mach I. It has all the features and slight movement of the stick gives a very loud click and positive action in all four directions. There are two handle buttons and two base buttons as well.

The most expensive item was the Euromax HAL Joy Ball. This wasn't like a trackerball, but an ordinary joystick with a ball where you normally find the stick. The idea is to wrap your whole hand round the ball which gives a firmer response. I didn't like this one at all. The ball is made of thin hollow plastic and has no weight. In use, it was much harder to control than a joystick, and the absence of suction cups didn't help. The only good point about this joystick was the auto-fire function being a button, not a switch, enabling bursts of auto-firing. The price at three times that of a normal joystick is outrageous.

The Amstrad JY1 was produced by Amstrad to sell with its CPC464 computer a couple of years ago. There are still a few in the shops. The JY1 is a bare bones joystick, and at £9.95, does not compete with some of the others. Another well-known company in the joystick world is Kempston. I tried its Pro 5000 joystick, and didn't find it too exciting, especially at £12.95. This and the Joy Ball were the only sticks in the survey without fire buttons on the actual stick, and I found this restrictive. A very plain and unexciting stick is the Moonraker I. This assembles from a separate handle and base, and you also have to fit the suction cups. The only interesting thing about this stick is the price. W H Smith was selling them for £5.95, and I have seen them as cheap as £3.

I found the Switch Joy SJ-1 at an Amstrad computer exhibition, and I've never seen it in any of the shops. This stick is very nice, second only to the Mach I in response and feel. It's a smallish unit with all the features (see the box below) and well worth considering.

Unlike many other computer items, there is a lot of variation in the price of joysticks. For example, the Quickshot II can vary from as little as £6.95 at computer exhibitions, through £9.95 in most high street shops, to as much as £13.95 in Tottenham Court Road.

Other joysticks vary by similar amounts, and you would be well advised to shop around. If you want something rather special, you may find that only major dealers carry it.

The table below shows the prices I paid for the joysticks reviewed.

JOYSTICK COMPARISONS

Name	S	A	M	B	Price	Marks	Comments
Quickshot II	Y	Y	N	N	£9.95	7	Very popular
Mach I	Y	Y	Y	Y	£7.95	10	Best overall
Joy Ball	N	Y	N	Y	£29.95	2	Overpriced
Amstrad JY1	Y	N	N	N	£9.95	4	Nothing good
Kempston 5000	N	N	Y	Y	£12.95	5	No features
Moonraker	Y	N	N	N	£3.95	6	Very cheap
Switch Joy	Y	Y	Y	Y	£7.95	8	Nice feel

Y: Yes N: No A: Auto-fire B: Base button S: Suction cups M: Microswitches

Joystick prices vary, you are advised to shop around

Compact mice

A mouse is another alternative keyboard input device, and technically it works very much like a joystick. However, mice are usually found in completely different applications. A joystick is mainly for games. A mouse is for serious work!

With the earlier machines there are two market leaders. The best known is Advanced Memory Systems (AMS) with its AMX Mouse, and also popular is the Wigmore Megamouse, bundled with the excellent Peartree *Artist* package. At the time of writing (November 1986) neither of these companies has adapted its mouse for use with the Compact, which is strange as all they have to change is the plug at the end of the mouse's tail. Filling this gap comes another company, Nidd Valley Systems, who already produces the Digimouse for the model B and Master, and has altered it for the Compact. This is the only Compact mouse available.

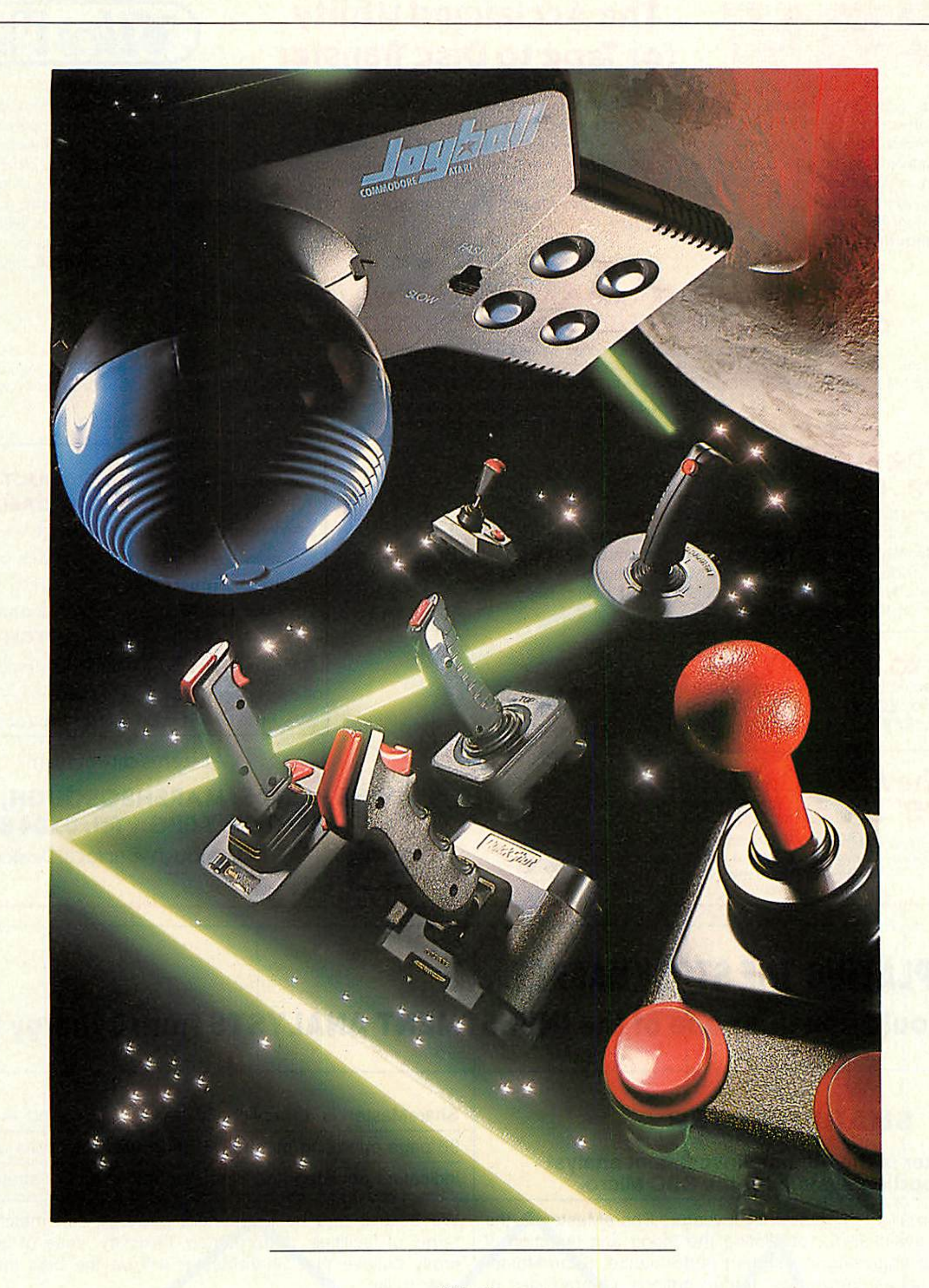
The Digimouse has been chosen by Olivetti to bundle in with its PC128S, the Italian version of the Compact called the Prodest. It has been sold in this country as part of Clares' excellent *Art Room* software package, but only recently did Nidd decide to sell the mouse alone.

The review mouse came with the six-page manual from the model B version and a typed sheet explaining the differences. I received no software, and all references in the manual to software were deleted. I assume that Nidd Valley will quickly get its software (mouse control program and test program) transferred to the Compact. The only other information in the booklet was notes on the specification, warranty, cleaning and so on.

The Digimouse plugs into the same port as a joystick and works well on the Desktop software provided on the Welcome disc. Experienced users will be able, with the pointer ROM, to make the mouse work with *View*, and so on. For the rest, using the pointer ROM will be covered later in this series of Compact articles. There is not a great deal of software around today which uses Digimouse, but I hope this will improve. I tried the mouse with AMX *Super Art*, but unfortunately it didn't work.

Physically, the mouse is in a two-tone plastic case, and has a rubber ball underneath, and three buttons on the surface. Unlike most other mice, the tail comes away towards the user's body. The buttons click down and click back. They are at an angle of 45 degrees on the mouse, and you must press them down relative to the floor, not relative to the buttons. Once you remember this, the mouse works very well. The construction is generally very robust.

The mouse has one very well thought out feature which Nidd Valley calls 'linear lock'. A mouse normally moves the cursor both up/down and left/right at the same time. This feature temporarily disables the movement signal in one direction, allowing precision placing of the cursor or pointer in the other direction. Very useful.



All the joysticks work well, you don't get rubbish with sticks

The Digimouse retails at £37.90 including VAT. If Nidd gets round to including driver software for the Compact, then this is a good buy.

What to look for on a joystick

Suction cups: Some joysticks have plastic suction cups on the base. Others only have pads which tend to slip on some surfaces. The plastic cups are a lot better, and hold the joystick firmly while you are swinging the stick around. Essential for games!

Auto-fire: This is a little switch, usually on the base of the joystick which, when activated, will simulate fast and repeated pressing of the fire button. The joystick instructions may tell you auto-fire only works with certain computers. It works fine on the Compact. This is well worth having.

Microswitches: Older joysticks need to be moved as much as a centimetre to make contact, and there is no feedback from the stick. Microswitches are used on modern joysticks. Required movement is much less, and you get a click to confirm that contact has been made.

Fire buttons: Most sticks have a fire button (often two) at the top of the stick. Good sticks also have further button(s) on the base unit. This suits some games and some players. The Kempston 5000 only has base buttons. Some buttons have a feedback click which is helpful.

Centring: All switched sticks should return to the centre when you let go of the stick. This is vital. Reject any that don't.



Picture shows 20 and 28 megabyte units. 40 and 56 megabyte units may be slightly taller in size.

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The Viglen Winchester is ready to plug straight into your BBC Master or if you have a B or B plus you will simply have to fit an ADFS ROM. You can use up to two floppy disk drives in conjunction with the unit and, fitted to the B+ or Master, the floppies can double their capacity by running in double density mode.

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Acorn ADFS Rom with utilities (essential for BBC B and B Plus)	29.95
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WHAT DO I GET FOR MY MONEY

1. Winchester Unit – (winchester drive, controller boards, power supply and fan all fitted in one compact case). The fan is recommended in order to keep the winchester at the correct operating temperature.

2. Master Reference manual part 1 (for a BBC B or B plus you will require the Acorn ADFS Rom and utilities available at an extra cost).

3. Winchester user guide.

4. Additional utilities on the winchester including formatter, verifier, ADFS menu and backup programme.

PLUG IN SECOND DRIVE

The Acorn ADFS can handle up to two winchester drives. These are accessed as drive 0 and 1 (the floppy disc drives being accessed as drives 4 and 5). Viglen winchesters are supplied as Drive 0 (single unit) and Drive 1 (Second drive for single unit). The Viglen drive 1 can be instantly plugged into drive 0 and used either as a backup for Drive 0 (and perhaps taken off and stored away) or for more online mass storage. This will enable you to back up 20 Megabytes in under 7 minutes.

COMPATABILITY?

Viglen winchesters are 100% compatible with the Acorn winchesters and the ADFS. Any program that will run on the Acorn winchester will also run on the Viglen winchester. The winchesters also run with the Acorn Master 512 board with DOS plus (CPM86 and MSDOS compatible operating system).

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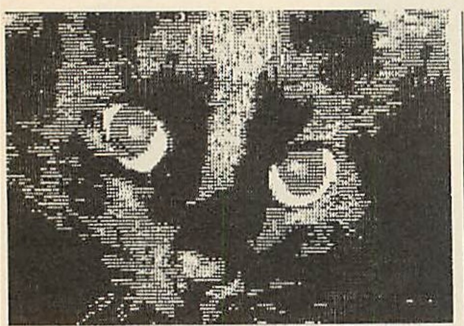
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ACORN USER OFFERS

User Dump – Acorn User's printer control ROM – £19.95


Dump graphics screens with User Dump

User Dump includes a ROM chip which plugs into any free sideways ROM socket on your BBC micro, and an easy-to-follow manual. With the *User Dump* ROM installed you'll have access to a wide range of commands to help you control your printer's facilities – all for just £19.95.

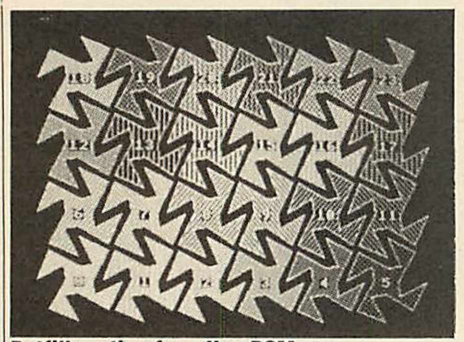
You will be able to dump any screen image in any display mode by entering a single command – either as a line of your program or alternatively by typing in direct from the keyboard. *User Dump* will also give a perfect dump while a machine code program is running.

This versatile ROM will work with all the popular dot-matrix printers, including all those with single and double density big-image graphics.

Send an A4 SAE to Seran at Redwood Publishing, 141-143 Drury Lane, London WC2B 5TF, for more details.

Order form on page 130.

User ROM – Acorn User on a chip only £19.95


Dotfill routine from UserROM

The *Acorn User UserROM* brings the best of *Acorn User* into your micro. Put together by our technical editor, Bruce Smith, this 8k ROM chip is packed with your favourite *Acorn User* routines. Simply plug the ROM chip into a sideways ROM socket and all the routines are instantly accessible via easy-to-use *commands – what could be simpler?

Routines include the popular colour fill and dot fill routines, bad program recovery, variable lister, function key lister, a graphics compiler, a circle drawing routine, sound compiler, plus lots, lots more!

Included with *UserROM* is a 22-page manual which explains how to get the most from your *UserROM*, and you'll find many demonstration programs showing how to use the new commands.

Full details available by sending an A4 SAE to Seran, Redwood Publishing, 141-143 Drury Lane, London WC2B 5TF.

Acorn User Assembler Extension ROM just £19.95!

```
Assembler Extension ROM (AXR) 1.10
 BITS  (Use *BITS for help on OPT)
 ASSM <src> <OPT 1> (<OPT 2>) (<dest>)
 DSM (<address>) (<ROM>)
 LVAR
 STRIP <fsp> (<:>)
 FX 104,0,0 to disable
 Condition: On
```

AXR for machine code programmers

The *Acorn User Assembler Extension ROM (AXR)* is aimed at the machine code programmer. It is compatible with Basic versions 1 and 2 – a Master version is due.

The *AXR* extends the Basic assembler to allow a variety of assembly options and commands. Some are outlined below.

- Bit 0 to 2 – Usual OPT functions
- Bit 3 set – Write to file and RAM
- Bit 4 set – Write to file only
- Bit 5 set – Branch to jump
- Bit 6 set – Enhanced error reporting
- Bit 7 set – Flag duplicate labels

The *AXR* adds several new pseudo op codes to the assembler. These are: ORG – sets the origin for assembly; DST – specify destination; DFB – defines a byte; DFW – define word; DFD – define double word; DFR – define string; SWR – set the sideways RAM number.

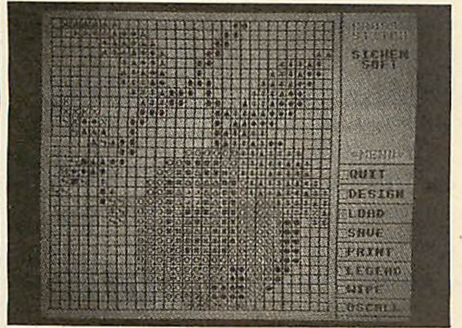
Please send an SAE to Seran at Redwood Publishing for full details.

Order form on page 130 – 24 hour telephone service (0672) 40825

PROGRAM LISTINGS

ACORN USER OFFERS

February listings on cassette £3.95 and disc £5.95


An embroidery design from *Cross Stitch*

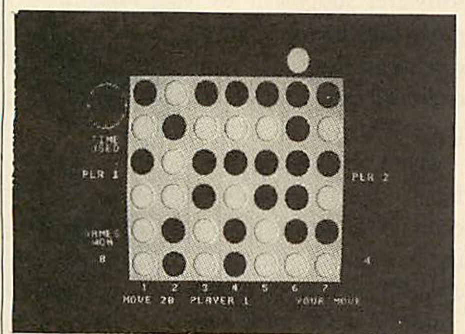
This month try your hand at computer-aided design with a program from Anneke Sicherer-Roetman. Anneke's programs will help you to design fabulous embroidery patterns. While Peter Sandford continues his graphics article by explaining how to plot graphs with *ViewSheet* and *ViewStore*.

School network users will be keen to get going with Robert Newman's programs for networks. And David Atherton tackles using joysticks with the Master Compact.

All the programs in this issue are on both disc and cassette. The disc is fully menu driven and a good buy at only £5.95. Electron owners remember the disc is compatible with Advanced Plus 4 disc interface with 5.25in disc drives. There's a special graphics bonus on the cassette and disc. The cassette versions for both the BBC and Electron contains a tape to disc transfer program — all for just £3.95.

Order form on page 129.

Save yourself trouble with our monthly disc and cassette

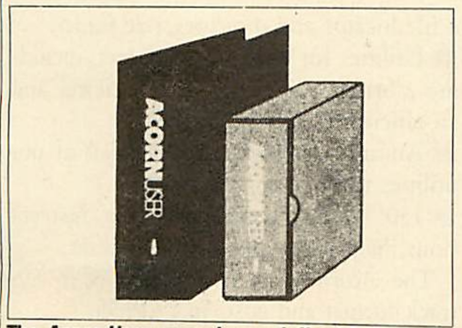

Quadline on the free *Games Compendium*

Save yourself the trouble of ordering your disc or cassette listings each month and take out a subscription. We'll send you our great *Games Compendium* cassette when you apply for a cassette subscription – worth £3.95, or you may prefer to try us out for six months, which will cost you £20, a saving of over £3. These offers are only open to UK subscribers not overseas.

New *Acorn User* monthly disc subscribers (in the UK) are entitled to receive one of our smart grey cloth disc binders in its own sturdy slip case – normally priced at £9.95. So you'll be able to keep your monthly discs in safety. If you prefer, you may subscribe at the six month discounted price of £30 – a saving of over £5.

Which ever you choose, you won't regret investing in our monthly listings, they'll provide you with useful utilities, graphic abilities, entertainment and much more throughout the year.

Reduced price disc binder at only £6.95



The *Acorn User* magazine and disc binders

For a limited period only, we are offering our superb quality grey cloth *Acorn User* disc binder – in its own slip case for the reduced price of £6.95 – so you'll make a £3 saving when you buy one now.

The binder has a big 30mm capacity so it will hold all of your monthly discs for a year. Also, included are six transparent inserts, each capable of holding two 5.25in discs. There is also a sturdy slip case, which will protect the binder and discs.

If you haven't already taken care of it, it's time to get in your orders for your new year's *Acorn User* magazine binder, so that you can go on protecting your precious copies of *Acorn User* magazine from excess wear and tear. The red magazine binder features a wide spine with the capacity to hold 12 issues of more than 200 pages which are held in place with metal strips.

Send in your orders now, see the order form on page 129.

Order form on page 129 & 130 – 24 hour telephone service (0672) 40825

NEW OFFERS

ACORN USER OFFERS

Get out of trouble with the Disc Help Disc – only £6.95

Using discs & disc drives with
your BBC Micro
MENU

A. What are discs & disc drives?
B. Saving & loading BASIC programs
C. Catalogues, Directories & Libraries
D. Copying files & whole discs
E. Deleting files & stopping accidental deletion
F. All about auto-booting discs
G. All sorts of odd commands
H. Transferring BASIC programs from cassette to disc
I. Test on the DFS
J. About HAMEBUG

Press A-J to run the program you want
(ESCAPE brings you back to this Menu)

The *Disc Help Disc's* menu page

Have you just bought a disc interface or disc drive? Do you have a disc interface and drive but are bamboozled by all the jargon? Do you simply want to know all about discs and how to use your disc filing system ROM to its full potential?

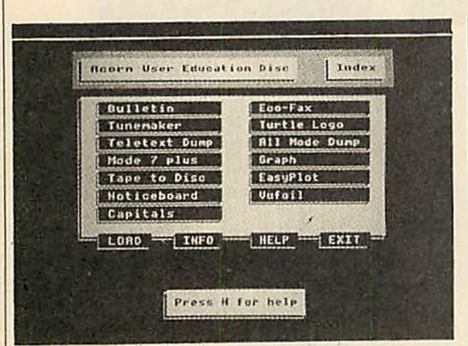
If you answer yes to any of these questions then *Acorn User* has the answer in the form of the *Disc Help Disc*, specially developed for the magazine by the North and Mid-Essex BBC Users Group.

Simply insert the *Disc Help Disc* into your drive and all the information you will ever need is at your fingertips. All aspects of file maintenance are covered and a disc filing system simulator allows you to practise use of the commands.

A question and answer tutorial at the end of each section ensures that you are able to evaluate your own knowledge. The disc is in 80-track format only.

Order using the form on page 130.

Wise up with the Education Disc at just £7.95



The *Education Disc* menu page

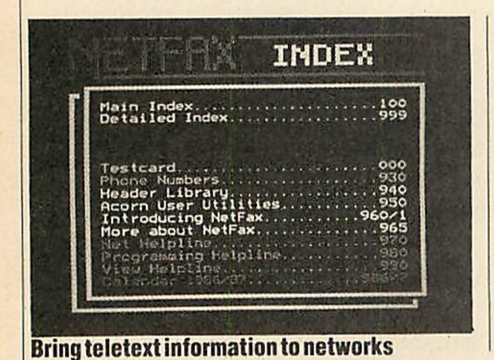
The *Education Disc* contains programs drawn from *Acorn User* magazine.

Eco-Fax is a sophisticated viewdata-type database for use on Econet systems, and comes with its own versatile frame editor. There is a colourful version of *Turtle Logo*; a program which shows equations as graphs; and a music writing program which allows you to edit tunes.

Graphics are a strong feature of the collection, including the *Easyplot* drawing software, supported by two other programs which use *Easyplot* screens as an electronic noticeboard or in place of an overhead projector. A bulletin board displays messages in scrolling characters.

There are routines to use in your own Basic programs – screen dumps, a machine code utility and graphics plotting and drawing commands in mode 7. The disc is available in 40 track format only, but can be copied to an 80 track disc.

Network Utility Disc only £19.95



Bring teletext information to networks

The *Acorn User Network Utility Disc* is the logical addition to your network, combining a wide range of invaluable routines with a sophisticated, yet easy-to-use teletext information system. The disc features:

- NetFax – our hybrid information system, provides thousands of pages of information which may be read without affecting any text or program in memory. It features an advanced teletext editor.
- Utilities for all network users, including a file locator and directory size finder.
- Utilities for network managers, including a bridge-compatible screen viewer and an efficient 'notify-all' facility.
- An auto-installer to transfer all of our utilities to your net painlessly.
- 150 NetFax pages, including instructions, help pages and sample indexes.

The *Acorn User Utility* disc is in 80-track format and costs just £19.95.

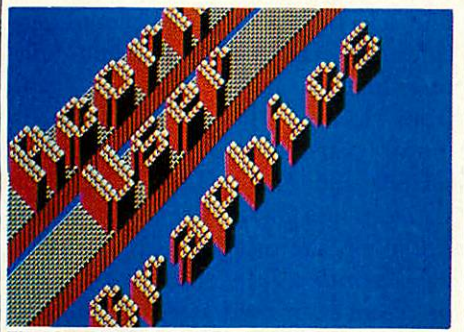
See page 130 for your order form.

Order form on page 130 – 24 hour telephone service (0672) 40825

NEW OFFERS

A C O R N U S E R O F F E R S

Graphics Utilities Disc a bargain at £7.95



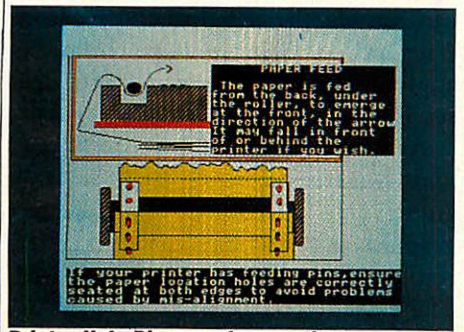
The ***Graphics Utilities Disc*** **makes life easy**

The *Acorn User Graphics Utilities Disc* contains four sections. Sixteen machine code routines enable you to manipulate blocks of graphics. Rotation and reflection utilities are included, together with a screen compressor/expander, a colour flood-fill routine and three screen-mode conversion commands.

The Basic procedure library includes routines to produce multi-height, proportional and justified text as well as a procedure for "drop-shadow" boxes. All of the procedures can be readily used in your own programs.

An advanced teletext screen editor gives you point-plotting and line-drawing, rubber-banding and even a flood-fill. In addition, full text facilities including all the mode 7 control codes are available. The program is easy to use with detailed help screens and has been written in 100 per cent machine-code for speed.

Acorn User's comprehensive Printer Help Disc at £7.95



Printer Help Disc: **much more than a manual**

Written by Benjamin Rietti, the programs and tutorials on this disc will help you to understand your printer's facilities.

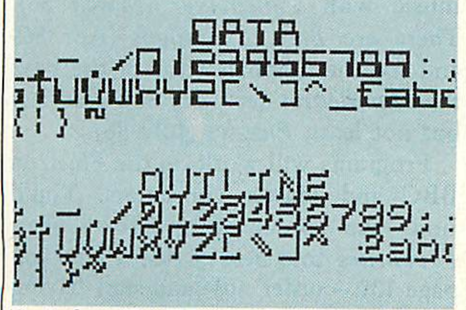
Printer manuals often don't fully cover the needs of Master and BBC micro series owners – our printer help disc will! It includes what to look for in a printer, controlling type styles, using *Wordwise* and *View*, screen images, printer care, an ASCII standard codes table plus how to print £ signs, clear diagrams illustrating various stages of printer use and a program to display type styles. The *Printer Help Disc* will help you solve problems.

The disc is available in 40 and 80 track format, and is compatible with the BBC models B, B+ and Master 128.

For more printer compatibility details please send a stamped addressed envelope to Seran, Redwood Publishing 141-143 Drury Lane, London WC2B 5TF.

Order form on page 130.

Acorn User's Sideways RAM Utilities Disc £9.95



Fonts from the *Sideways RAM Utilities Disc*

What could be more helpful than our new *Sideways RAM Utilities Disc*?

Available in 40 track format with a transfer program for 80 track users, the disc includes:

- RamPad – an electronic notepad you can use at any time. Simply press a key for your computer's answer to the notebook and pencil.
- On-screen fonts – a variety of print styles available in all graphics modes.
- *HLP ROM – add your own help text to call up when you're really stuck.
- Standard ROM header – a sideways ROM header you can use as a starting point when writing your own ROMs.

Many more utilities – including *RLOOK to examine the contents of your ROM's and sideways RAM images. The disc is great value at just £9.95.

Order your *Sideways RAM Utility Disc* using the form on page 130.

Order form on page 130 – 24 hour telephone service (0672) 40825

NEW OFFERS

ACORN USER OFFERS

The Gallery disc– great graphics for only £6.95!



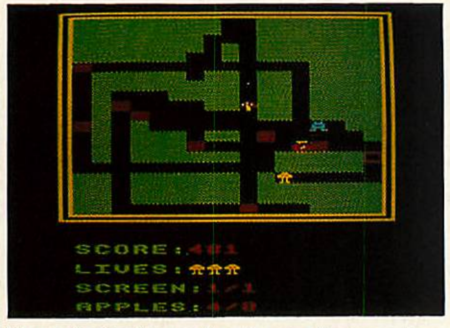
Dallas captured on the *Gallery Collection*

Christmas is not far around the corner, and with you in mind we've put together another stunning range of graphics screens, called the *Gallery Collection.* Combine the *Gallery* disc and *Gallery Collection* disc and you'll have an ideal gift for the graphics enthusiast or treat yourself!

The *Gallery Collection* features an automatic scrolling display of over 25 exciting graphics screens. Enjoy our fine selection of digitised pictures including the Dallas compendium, Spitting Images, and a picture of earth from space. Plus super cartoons, motor cars, some science fiction screens and much much more. Plus you can use *Super Painter* and *Pixel Editor* on the original *Gallery* disc to dabble with a little creativity and edit or create your own screens.

See page 130 for your order form.

Acorn User's Games Compendium Cassette – £3.95



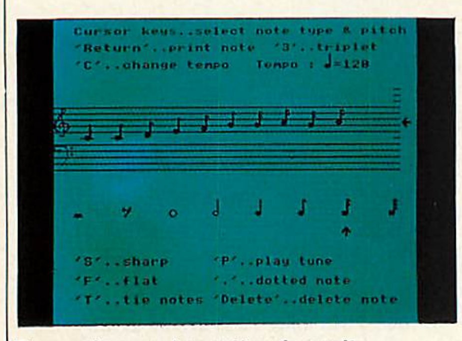
Shuggy's Garden* on the *Games Compendium

The Acorn User Games Compendium brings the best games published in *AU* over the past two years to BBC micro, Master and Electron owners. Included are David Acton's blockbuster *Spectramania* and the popular *Quadline* – see if you can get four in a row! Puzzle fanatics will get great enjoyment from our *Picture Slide* game while many will be amazed at Dave Lawrence's 3-D *Maze.* Adventurers can sample the delights of the *Acorn User* office. Why not go collecting apples in *Shuggy's Garden,* or be all at sea in *Run Silent, Run Deep*?

As a special bonus for BBC micro and Master owners, there is Rob Anderson's adventure with scrolling graphics. All programs can be transferred to disc automatically if desired. The cassette costs £3.95.

See page 130 for your order form.

Acorn User Finest Favourites Cassette – just £3.95



Tunemaker: an *Acorn User* favourite

Following the popularity of the *Best of Acorn User* Cassette, we introduce our new favourites selection.

Don't miss captivating curves with *Lisajous Figures* (Nov 85). Use our *Screen Fonts* (Dec 85) to anotate charts and diagrams. And why not save those graphics screens in less space with the *Screen Compression* program (Dec 85).

Cheat at the popular game *Elite* with our *Elite Editor* (Feb 86). Try entering music with *Tunemaker* (March 86). There are *Basic Extensions* (Apr 86) and for the graphics treat of the year the *Mandlebrot Set* (May 86). And last but not least, *Puzzles* (July 86).

Programs will work on the Electron BBC and Master computers. You'll find the order form for *Finest Favourites* and *Best of Acorn User* on page 130 – order now and start having some fun!

Order form on page 130 – 24 hour telephone service (0672) 40825

YELLOW PAGES

INDEX/COMPATIBILITY

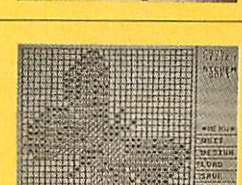
Entering listings

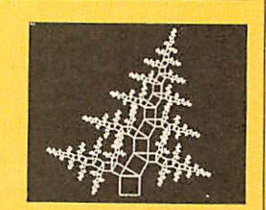
To make the task of entering listings easier, *Acorn User* has adopted several standards in the Yellow Pages. Programs are listed with line numbers in increments of 10, so type AUTO <Return> for automatic line numbering before you start. Before you list what you've entered, type LISTO 1 <Return> to provide spaces after the line numbers. Programs in the Yellow Pages are often listed to a width of 40 characters, so type MODE 6 <Return> before you start. Comparing the line-endings of your listing with the Yellow Pages will help you spot extra or missing characters.

To make sure that the program you want to enter will work on your particular machine, check the index below. All the listings work with Basic 1,2 and 4 (unless stated otherwise) and with operating system OS1.2 or above. If a program is accompanied by an article, please read the article first. If special care is needed when entering, we provide a 'How to Enter' box.

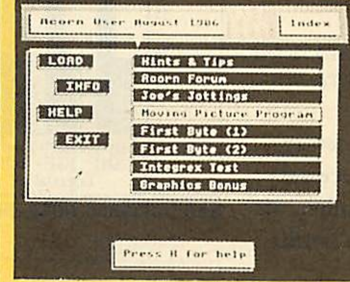
Once you've typed in your program, save it to tape or disc then test it by running it. If you have a major problem with a listing, ask someone to check it. You can also send off for a list of *Checksums* which help you find the errors. Send a large SAE (24p stamp) to AU Checksums, PO Box 641, London NW9 8TF.







DISCS AND TAPES



All the listings on these pages can be found on this month's listings disc or cassette. See page 109 for details.

BACK ISSUES





For help with entering and debugging listings see the following back issues: April '86, June '85, Aug '84, Sept '83.

Program	Page	BBCB	BBCB+/128k	BBC with ADFS	Shadow RAM	Electron	Electron with Plus 1	Plus and Plus 3	Master 128	Master 128+ ADFS	Master Compact	6502	Econet	Tape and disc
Sandford	114													
Listing 1		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Listing 2		Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	N[1]	Y
Listing 3		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Listing 4		Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	Y
Atherton	119	N	N	N	N	N	N	N	N	N	Y	N	Y	Y
Cross Stitch	120													
Listings 1-2		Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	Y	Y
Newman	125													
Listing 1[2]		Y	Y	Y	Y	N	N	N	Y	Y	Y	N	Y	Y
Pythagoras Listings 1-3	128	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Y = Yes N = No

[1] = Will work with networked Master 128's and Compacts

[2] = Requires use of Econet

How to enter Dataplt modifications

To obtain the complete listing 2 proceed as follows:

Enter listing 2 as shown and save as a spooled file called SP1. Load listing 1 and delete lines 10 to 210 inclusive and renumber the remainder of the listing as follows: REN.4000 and save as a spooled file called SP2.

Load the *Graplt* listing from last month's issue (page 125) and delete lines 10 to 2530 and 2590 to 2830 inclusive, to leave lines 2540 to 2640 which is the definition for FNinterval. Save this as a spooled file called SP3.

Load *Dataplt* from last month's issue (page 179 to 183) and then *EXEC in the previously saved spooled files as follows:

LOAD"DATAPLT"
*E.SP1
*E.SP2
*E.SP3

Renumber and now save the new listing 2 before re-loading at &1300 to use.

If you have a 6502 second processor, or are running the program on a Master or model B with shadow memory, the modified program should be run at the default setting of PAGE, and line 60 should either be deleted or amended accordingly. Users with an unexpanded model B should pack the program by deleting all spacing lines (ie, those containing only a colon), and adding the following:

(Where "DATAvs" is the filename of the new program.)

```
60 IF PAGE<>&1300 THEN  PAGE=&1300:LOAD"DATAvs"
```

If you still experience the dreaded 'no room' error message, further memory savings can be made by deleting unnecessary spaces within the program, or by reducing the number of program lines by combining single statements into multi-statement lines.

Note setting PAGE = &1300 leaves room for only one disc file to be open at time. If you subsequently amend the program to read data from more than one file at a time, you will need to set PAGE higher.

The monthly disc and cassette contain a compacted version of this program for use on a standard BBC B micro.

Before you run the new program, you will to save a modified version of the *Dotfill* machine code routine from the January 1985 article on the same disc. This needs to be assembled to run higher in memory, to allow disc files to be opened and read. Load in the assembly language source code for *Dotfill*, and amend the values of the variables 'code' and 'workspace' (line 70) to read &1600 and &1500, respectively. Omit line 90, and change line 110 to read:

110 *SAVE DOT1600 1600+2FF

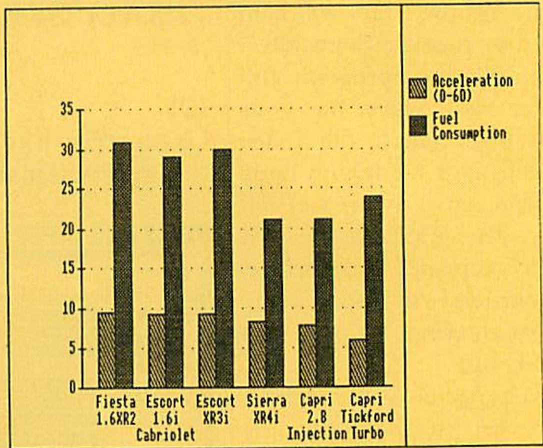
This will set *Dotfill* to run at an address of &1600, using a page of memory at &1500 as workspace. You may however wish to modify these addresses to suit the memory map of the particular system you are using (see below). Again, the *Dotfill* code is on the monthly disc and cassette.

As it stands, PAGE must be set to &1900 before the program will run. This setting should enable the program to run without modification on a model B with shadow memory, or on a B+ or Master in shadow mode, or on a 6502 second processor. Users of the latter two systems may however wish to make more efficient use of memory by using the following configurations:

	PAGE	DOTFILL 'code'	DOFILL 'workspace'
Master	&1300	&F00	&E00
6502	&C00	&900	&800

Alternatively, PAGE could be left at its default setting (&E00 or &800) and DOTFILL assembled to run at the top of user memory (&7C00-7FFF).

Users of an unexpanded model B will find that the program is too lengthy to run in its present form, and will have to reduce memory requirements and the program will need to be heavily compacted by either joining lines into multi-statement lines and/or shortening variable names. A packed version of the program is on the monthly disc and tape.



See Database links, page 161

Listing 1. ViewSheet file data reader

```
 10 REM Viewsheet File Data Reader
 20 REM By Peter Sandford
 30 REM For BBC B/B+/M/C/E
 40 REM (c) Acorn User February 1987
 50 :
 60 PROCevaluate("V.VS1")
 70 PRINT "File size is ";xc;" x  ";yc
 80 PRINT "Minimum value = ";min
 90 PRINT "Maximum value = ";max
100 PRINT
110 :
120 C%=OPENUP("V.VS1")
130 FOR y=1 TO yc
140 FOR x=1 TO xc
150 PRINT FNread(x,y);
160 NEXT
170 PRINT
180 NEXT
190 CLOSE #C%
200 END
210 :
220 DEF PROCevaluate(F$)
230 C%=OPENIN(F$)
240 PTR #C%=3
250 yc=BGET #C%
260 xc=BGET #C%
270 PTR #C%=6
```

Continued▶

◀Listing 1 continued

```
280 min=0:max=0
290 FOR J%=1 TO xc*yc
300 INPUT #C%,data
310 IF data<min THEN min=data
320 IF data>max THEN max=data
330 NEXT
340 CLOSE #C%
350 ENDPROC
360 :
370 DEF FNread(x,y)
380 PTR #C%=((y-1)*xc+x-1)*6+6
390 INPUT #C%,data
400 =data
```

Listing 2. Modifications to *Dataplt*

```
  10 REM Modifications to DATAPLT
  20 REM By Peter Sandford
  30 REM For BBC B/B+/M/C/E
  40 REM (c) Acorn User February 1987
  50 :
  60 IF PAGE<>&1300 PRINT "Reload at PA
GE=&1300":END
  70 :
2070 DEF PROCplotdata
2080 plotchar=35:F$="V.VS1"
2090 PROCwindow(2):CLG
2100 PROCwindow(1):CLG
2110 PROCevaluate(F$)
2120 yint=FNinterval((max-min)/10)
2130 ymin=yint*INT(min/yint):ymax=yint*
INT(max/yint+1)
2140 sets=xc:points=yc
2150 PROCdrawaxes
2160 C%=OPENUP(F$)
2170 FOR S%=1 TO sets:PROCredefine(S%)
2180 FOR P%=1 TO points
2190 data=FNread(S%,P%):PROCplot(FNxc(P
%),FNyc(data))
2200 NEXT P%,S%
2210 CLOSE #C%
2220 FOR S%=1 TO sets
2230 L$=FNinputstr("Title for data set
"+STR$(S%)+" (max 25 letters) ",25)
2240 PROCredefine(S%):PROCkey(L$,S%)
2250 NEXT
2260 ENDPROC
```

Listing 3. *View* macro file reader

```
 10 REM View Macro File Reader
 20 REM By Peter Sandford
 30 REM For BBC B/B+/M/C/E
 40 REM (C) Acorn User February 1987
 50 :
 60 PROCevaluatemacro("DLINK")
 70 PRINT "Number of records = ";recor
ds
 80 PRINT "Number of fields = ";fields
 90 PRINT "Maximum data value = ";max
100 PRINT "Minimum data value = ";min
110 PRINT
120 :
130 C%=OPENUP("DLINK")
140 FOR record=1 TO records
150 FOR field=1 TO fields
160 PRINT FNreadmacro;" ";
170 NEXT
180 PRINT
```

Continued▶

◀ Sandford listing 3 continued

```
190 NEXT
200 CLOSE #C%
210 END
220 :
230 DEF PROCevaluatemacro(F$)
240 C%=OPENUP(F$)
250 records=0:max=0:min=0
260 REPEAT
270 fields=0
280 REPEAT
290 A$=FNreadmacro
300 IF VAL(A$)>max max=VAL(A$)
310 IF VAL(A$)<min min=VAL(A$)
320 fields=fields+1
330 UNTIL data=&0D
340 records=records+1
350 UNTIL EOF#C%
360 CLOSE#C%
370 ENDPROC
380 :
390 DEF FNreadmacro
400 LOCAL A$
410 A$=""
420 data=BGET#C%:IF data=&80 THEN PTR#
C%=PTR#C%+2:data=BGET#C%
430 IF data=ASC"<" THEN endchar=ASC">"
 ELSE endchar=ASC",":PTR#C%=PTR#C%-1
440 REPEAT
450 data=BGET#C%
460 IF data<>endchar AND data<>&0D THE
N A$=A$+CHR$(data)
470 UNTIL data=endchar OR data=&0D
480 =A$
```

Listing 4. Bar chart plot of *View* macros

```
 10 REM Barchart Plot of View Macros
 20 REM By Peter Sandford
 30 REM For BBC B/B+/M/C/E
 40 REM (C) Acorn User February 1987
 50 :
 60 IF PAGE<>&1900 PRINT"Re-load with
PAGE=&1900":END
 70 dotfill=&1600:*LOAD DOT1600
 80 MODE 0
 90 PROCinit
100 ON ERROR PROCerror
110 REPEAT
120 CLS:PRINTTAB(16)"BARCHART PLOTTING
 UTILITY - ENTER OPTION (1-5)"
130 PRINT" 1) DRAW BARCHART  2) DRAW L
ABEL  3) LOAD SCREEN  4) SAVE SCREEN  5)
 SCREENDUMP";
140 K%=(GET OR &10)-48
150 CLS
160 IF K%=1 PROCbars
170 IF K%=2 PROClabel
180 IF K%=3 PROCload
190 IF K%=4 PROCsave
200 IF K%=5 PROCdump
210 UNTIL FALSE
220 END
230 :
240 DEF PROCerror
250 CLOSE#0:PROCwindow(0):VDU4:CLS:REP
ORT
260 IF ERR<45 AND ERR<>17 THEN PRINT"
at line ";ERL;
270 PRINT" ... Press 'Q' to quit, any
other key to continue";
280 K%=GET AND &DF:PRINT
```

Continued▶

◀Sandford Listing 4 continued

```
  290 IF K%=81 VDU23,48,&663C;&7E6E;&667
6;&3C;:PROCoscli("FX4,0"):END
  300 ENDPROC
  310 :
  320 DEFPROCinit
  330 PROCwindow(0):PROCcursoroff:*FX4,1
  340 PROCdraw(1,68,1,1023):PROCdraw(1,1
023,1279,1023)
  350 PROCdraw(1279,1023,1279,68):PROCdr
aw(1279,68,1,68)
  360 PROCdraw(952,68,952,1023):PROCwind
ow(1)
  370 cx=480:cy=875
  380 DIM osblock 30,tone%(5)
  390 L$=STRING$(25," ")
  400 A$=STRING$(60," "):an$=A$:mess$=ST
RING$(79," ")
  410 VDU 23,48,&663C;&6666;&6666;&3C;
  420 ENDPROC
  430 :
  440 DEF PROCwindow(w)
  450 IF w=0 VDU 28,0,31,79,30
  460 IF w=1 VDU 24,8;72;944;1016;
  470 IF w=2 VDU 24,960;72;1272;1016;
  480 IF w=3 VDU 24,8;72;1272;1016;
  490 ENDPROC
  500 :
  510 DEF PROCmovecursor
  520 PROCwindow(3):PROCcursor(cx,cy)
  530 CLS:PRINT SPC(4)"Use CURSOR KEYS t
o position cursor, & press RETURN when r
eady to proceed"
  540 PRINTTAB(24,1)"Cursor position (X,
Y): ";cx;TAB(51,1)",";cy;
  550 xs=2:ys=4
  560 REPEAT
  570 ox=cx:oy=cy
  580 cx=cx+xs*INKEY(-26)-xs*INKEY(-122)
  590 cy=cy+ys*INKEY(-42)-ys*INKEY(-58)
  600 IF cx<8 OR cx>1272 cx=ox
  610 IF cy<72 OR cy>1016 cy=oy
  620 IF ox<>cx THEN xs=xs+2
  630 IF oy<>cy THEN ys=ys+4
  640 IF ox=cx AND oy=cy THEN xs=2:ys=4
ELSE PROCcursor(ox,oy):PROCcursor(cx,cy)
:PRINTTAB(47,1);"     ,     "TAB(47,1);cx;
TAB(52,1);cy;
  650 UNTIL INKEY(-74)
  660 PROCcursor(cx,cy):PROCblip
  670 IF cx<952 THEN PROCwindow(1) ELSE
PROCwindow(2)
  680 CLS
  690 ENDPROC
  700 :
  710 DEF PROCcursor(x%,y%)
  720 MOVE x%-32,y%:PLOT 2,64,0
  730 PLOT 0,-32,-32:PLOT 2,0,64
  740 ENDPROC
  750 :
  760 DEF PROCsave
  770 F$=FNinputstr("FILENAME ",12)
  780 PROCoscli("*SAVE """+F$+""" 3000 7
B00")
  790 ENDPROC
  800 :
  810 DEF PROCload
  820 F$=FNinputstr("FILENAME ",12)
  830 PROCoscli("*LOAD """+F$+""" 3000")
  840 ENDPROC
  850 :
  860 DEF PROCoscli(A$)
  870 X%=osblock:Y%=osblock DIV 256
  880 $osblock=A$:CALL &FFF7
```

Continued▶

◀Sandford listing 4 continued

```
  890 ENDPROC
  900 :
  910 DEF PROCdump
  920 CLS:VDU 26
  930 REM Insert screen dump here
  940 PROCwindow(0):PROCwindow(3)
  950 ENDPROC
  960 :
  970 DEF PROClabel
  980 IF FNget("Select text or line draw
ing (T/L) :","TL")="L" PROCline:ENDPROC
  990 PROCmovecursor:PROCcursor(cx,cy)
 1000 cur$=FNget("Print text FROM cursor
 (F), or CENTRE text at cursor (C) ?","F
C")
 1010 M%=VAL(FNget("Select label mode: 1
) Background deleted 2) Background retai
ned 3) Underlining","123"))
 1020 A$=FNinputstr("Enter label",60)
 1030 L%=LEN(A$)
 1040 PROCcursor(cx,cy)
 1050 IF cur$="F" MOVE cx,cy+32 ELSE MOV
E cx-16*(L%/2),cy+32
 1060 VDU 5
 1070 IF M%=1 PRINT STRING$(L%,CHR$(9))+
STRING$(L%,CHR$(127));
 1080 PRINT A$;
 1090 IF M%=3 THEN PLOT 0,0,-4:PRINT STR
ING$(L%,CHR$(8))+STRING$(L%,"_")
 1100 VDU 4
 1110 ENDPROC
 1120 :
 1130 DEF FNget(mess$,in$)
 1140 PROCcursoron
 1150 PROCmessage
 1160 *FX 15,1
 1170 REPEAT
 1180 K%=GET
 1190 IF K%>96 AND K%<123 K%=K% AND &DF
 1200 IF K%>32 AND K%<42 K%=K% OR &10
 1210 an$=CHR$(K%)
 1220 UNTIL FNinstr(in$,an$)
 1230 CLS:PROCcursoroff:PROCblip
 1240 =an$
 1250 :
 1260 DEF FNinput(mess$,low,high)
 1270 PROCcursoron
 1280 PROCmessage
 1290 *FX 15,1
 1300 INPUT,value
 1310 IF value<low OR value>high THEN VD
U 7:GOTO 1280
 1320 CLS:PROCcursoroff:PROCblip
 1330 =value
 1340 :
 1350 DEF FNinputstr(mess$,len)
 1360 PROCcursoron
 1370 PROCmessage:PRINT
 1380 *FX 15,1
 1390 INPUTLINE TAB(40-len/2),an$
 1400 IF LEN(an$)>len THEN VDU 7:GOTO 13
70
 1410 CLS:PROCcursoroff:PROCblip
 1420 =an$
 1430 :
 1440 DEF PROCmessage
 1450 CLS
 1460 PRINTTAB(40-LEN(mess$)/2);mess$;
 1470 ENDPROC
 1480 :
 1490 DEF PROCcursoron
 1500 VDU 23;11,255;0;0;0
 1510 ENDPROC
```

Continued▶

◀Sandford listing 4 continued

```
1520 :
1530 DEF PROCcursoroff
1540 VDU 23;11,0;0;0;0
1550 ENDPROC
1560 :
1570 DEF FNinstr(A$,B$)
1580 IF LEN(A$)<LEN(B$) THEN =0
1590 =INSTR(A$,B$)
1600 :
1610 DEF PROCline
1620 PROCmovecursor
1630 x=cx:y=cy
1640 PROCmovecursor
1650 PROCdraw(x,y,cx,cy)
1660 ENDPROC
1670 :
1680 DEF PROCblip
1690 SOUND 1,-10,200,4
1700 *FX21,0
1710 ENDPROC
1720 :
1730 DEF PROCdraw(x,y,x1,y1)
1740 MOVE x-1,y:DRAW x1-1,y1
1750 MOVE x+1,y:DRAW x1+1,y1
1760 ENDPROC
1770 :
1780 DEF FNexp(N)
1790 LOCAL @%
1800 @%=&1010209
1810 A$=STR$(N)
1820 =VAL(RIGHT$(A$,LEN(A$)-INSTR(A$,"E
")))
1830 :
1840 DEF PROCdrawaxes
1850 LOCAL @%
1860 yscale=600/(ymax-ymin)
1870 yaxis=180
1880 xaxis=200-yscale*ymin:ydisp=0
1890 IF ymin>0 xaxis=200:ydisp=-ymin
1900 IF ymax<0 xaxis=800:ydisp=-ymax
1910 PROCdraw(yaxis,800,yaxis,200)
1920 PROCdraw(180,xaxis,920,xaxis)
1930 VDU 5
1940 exp=FNexp(yint)
1950 IF exp<0 @%=&1020009-&100*exp ELSE
@%=&1000009
1960 FOR val=ymin TO ymax STEP yint
1970 y=xaxis+(val+ydisp)*yscale
1980 A$=STR$(val)
1990 MOVE 164-16*LEN(A$),y+16
2000 PRINT A$
2010 PROCdraw(yaxis-8,y,yaxis+8,y)
2020 FOR X%=180 TO 920 STEP 24
2030 PLOT 69,X%,y
2040 NEXT X%
2050 NEXT val
2060 VDU 4
2070 ENDPROC
2080 :
2090 DEF PROCfill(x%,y%,tone%)
2100 CALL dotfill,x%,y%,tone%
2110 ENDPROC
2120 :
2130 DEF PROCinittones
2140 RESTORE 2170
2150 FOR J%=1 TO 5
2160 READ tone%(J%):NEXT
2170 DATA 9,2,5,4,3
2180 ENDPROC
2190 :
2200 DEF PROCbars
2210 F$="DLINK"
2220 PROCwindow(2):CLG
```

Continued ▶

◀Sandford listing 4 continued

```
2230 PROCwindow(1):CLG
2240 PROCinittones
2250 PROCevaluatemacro(F$)
2260 yint=FNinterval((max-min)/10)
2270 ymin=yint*INT(min/yint)
2280 ymax=yint*INT(max/yint+1)
2290 width=720/(records*fields)
2300 PROCdrawaxes
2310 C%=OPENUP(F$)
2320 FOR set=1 TO records
2330 A$=FNreadmacro
2340 PROClabelx(180+width*(fields*set-(
fields-1)/2),A$)
2350 FOR bar=1 TO fields-1
2360 data=VAL(FNreadmacro)
2370 PROCdrawbar(180+width*(bar+fields*
(set-1)),xaxis,yscale*(ydisp+data),width
,tone%(bar))
2380 NEXT bar
2390 NEXT set
2400 CLOSE#C%
2410 PROCdrawkey
2420 ENDPROC
2430 :
2440 DEF PROCdrawbar(x,y,h,w,t%)
2450 MOVE x,y:MOVE x,y+h
2460 PLOT 87,x+w,y:PLOT 87,x+w,y+h
2470 PROCdraw(x,y,x,y+h):DRAW x+w,y+h
2480 PROCdraw(x+w,y+h,x+w,y):DRAW x,y
2490 PROCfill(x+w/2,y+h/2,t%)
2500 ENDPROC
2510 :
2520 DEF PROCdrawkey
2530 PROCwindow(2)
2540 FOR P%=1 TO fields-1
2550 PROCbox(P%,tone%(P%))
2560 PROCtext(P%,FNinputstr("Enter text
(max 25 letters) ",25))
2570 NEXT
2580 PROCwindow(1)
2590 ENDPROC
2600 :
2610 DEF PROCbox(P%,T%)
2620 x%=968:y%=900-80*P%
2630 MOVE x%,y%:PLOT 1,0,40:PLOT 1,40,0
:PLOT 1,0,-40:PLOT 1,-40,0
2640 PROCfill(x%+20,y%+20,T%)
2650 ENDPROC
2660 :
2670 DEF PROCtext(P%,L$)
2680 VDU5
2690 MOVE 1024,934-80*P%
2700 IF LEN(L$)<16 THEN PRINT L$:VDU4:E
NDPROC
2710 IF FNinstr(LEFT$(L$,15)," ")=FALSE
 THEN VDU4:ENDPROC
2720 L%=16:REPEAT:L%=L%-1:UNTIL MID$(L$
,L%,1)=" "
2730 PLOT 0,0,16:PRINT LEFT$(L$,L%-1)+S
TRING$(L%-1,CHR$(8))+CHR$(10)+RIGHT$(L$,
LEN(L$)-L%)
2740 VDU4
2750 ENDPROC
2760 :
2770 DEF PROClabelx(x,L$)
2780 VDU5
2790 J%=0:L$=L$+" "
2800 REPEAT
2810 L%=FNinstr(L$," ")
2820 A$=LEFT$(L$,L%-1):L$=RIGHT$(L$,LEN
(L$)-L%)
2830 MOVE x-8*LEN(A$),186-36*J%
2840 PRINT A$
```

Continued ▶

◀Sandford listing 4 continued

```
2850 J%=J%+1
2860 UNTIL J%=3 OR LEN(L$)=0
2870 VDU4
2880 ENDPROC
2890 :
2900 DEF PROCevaluatemacro(F$)
2910 C%=OPENUP(F$)
2920 records=0:max=0:min=0
2930 REPEAT
2940 fields=0
2950 REPEAT
2960 A$=FNreadmacro
2970 IF VAL(A$)>max max=VAL(A$)
2980 IF VAL(A$)<min min=VAL(A$)
2990 fields=fields+1
3000 UNTIL data=&0D
3010 records=records+1
3020 UNTIL EOF#C%
3030 CLOSE#C%
3040 ENDPROC
3050 :
3060 DEF FNreadmacro
3070 LOCAL A$
3080 A$=""
3090 data=BGET#C%:IF data=&80 THEN PTR#
C%=PTR#C%+2:data=BGET#C%
3100 IF data=ASC"<" THEN endchar=ASC">"
ELSE endchar=ASC",":PTR#C%=PTR#C%-1
3110 REPEAT
3120 data=BGET#C%
3130 IF data<>endchar AND data<>&0D THE
N A$=A$+CHR$(data)
3140 UNTIL data=endchar OR data=&0D
3150 =A$
3160 :
3170 DEF FNinterval(int)
3180 exp=FNexp(int)
3190 int=int/10^exp
3200 IF int<2.5 int=1 ELSE IF int>=7.5
int=10 ELSE int=5
3210 =int*10^exp
```

Listing 5. Build V.VS1 file

```
10 REM Build V.VS1 File
20 REM by Bruce Smith
30 REM for BBC B/B+/M/C/E
40 REM (C) Acorn User February 1987
50 :
60 MODE 6
70 file%=&5000:chk%=0
80 PRINT''"Busy building V.VS1 file"
90 FOR loop=0 TO 255
100 READ byte
110 file%?loop=byte
120 chk%=chk%+byte
130 NEXT
140 IF chk%<>23003 PRINT"Data error":E
ND
150 *SAVE V.VS1 5000 5100
160 PRINT"V.VS1 file created"
170 END
180 :
190 DATA 0,0,0,12,3,170,255,0
200 DATA 0,164,28,143,255,0,0,152
210 DATA 55,143,255,0,0,224,68,143
220 DATA 255,0,0,16,36,143,255,0
230 DATA 0,224,68,143,255,0,0,64
240 DATA 78,143,255,0,0,224,43,143
250 DATA 255,0,0,152,80,143,255,0
```

Continued▶

◀Sandford listing 5 continued

```
260 DATA 0,104,88,143,255,0,0,208
270 DATA 54,143,255,0,0,224,93,143
280 DATA 255,0,0,152,105,143,255,0
290 DATA 0,72,60,143,255,0,0,120
300 DATA 102,143,255,0,0,120,127,143
310 DATA 255,0,0,168,69,143,255,0
320 DATA 0,0,122,143,255,0,0,172
330 DATA 10,144,255,0,0,240,82,143
340 DATA 255,0,0,88,124,143,255,0
350 DATA 0,236,16,144,255,0,0,168
360 DATA 94,143,255,0,0,136,16,144
370 DATA 255,0,0,184,33,144,255,0
380 DATA 0,240,107,143,255,0,0,220
390 DATA 2,144,255,0,0,112,20,144
400 DATA 255,0,0,80,67,143,255,0
410 DATA 0,152,80,143,255,0,0,220
420 DATA 2,144,255,0,0,64,53,143
430 DATA 255,0,0,104,63,143,255,0
440 DATA 0,152,80,143,255,0,0,32
450 DATA 75,143,255,0,0,192,90,143
460 DATA 255,0,0,152,105,143,0,0
470 DATA 0,0,0,0,48,24,12,0
480 DATA 0,0,126,0,126,0,0,0
490 DATA 48,24,12,6,12,24,48,0
500 DATA 60,102,12,24,24,0,24,0
```

Listing 6. Build DLINK file

```
10 REM Build DLINK File
20 REM by Bruce Smith
30 REM for BBC B/B+/M/C/E
40 REM (C) Acorn User February 1987
50 :
60 MODE 6
70 file%=&5000:chk%=0
80 PRINT''"Busy building DLINK file"
90 FOR loop=0 TO 173
100 READ byte
110 file%?loop=byte
120 chk%=chk%+byte
130 NEXT
140 IF chk%<>12738 PRINT"Data error":E
ND
150 *SAVE DLINK 5000 50AE
160 PRINT"DLINK file created"
170 END
180 DATA 128,88,88,70,105,101,115,116
190 DATA 97,32,49,46,54,88,82,50
200 DATA 44,32,57,46,53,44,32,51
210 DATA 49,13,128,88,88,69,115,99
220 DATA 111,114,116,32,49,46,54,105
230 DATA 32,67,97,98,114,105,111,108
240 DATA 101,116,44,32,57,46,51,44
250 DATA 32,50,57,13,128,88,88,69
260 DATA 115,99,111,114,116,32,88,82
270 DATA 51,105,44,32,57,46,49,44
280 DATA 32,51,48,13,128,88,88,83
290 DATA 105,101,114,114,97,32,88,82
300 DATA 52,105,44,32,56,46,51,44
310 DATA 32,50,49,13,128,88,88,67
320 DATA 97,112,114,105,32,50,46,56
330 DATA 32,73,110,106,101,99,116,105
340 DATA 111,110,32,44,32,55,46,56
350 DATA 44,32,50,49,13,128,88,88
360 DATA 67,97,112,114,105,32,84,105
370 DATA 99,107,102,111,114,100,32,84
380 DATA 117,114,98,111,44,32,54,46
390 DATA 48,44,32,50,52,13
```

See Jump for Joy, page 101

Listing 1. Joystick key emulator

```
   10 REM Joystick Key E
mulator
   20 REM by Dave Athert
on
   30 REM for Master Com
pact only
   40 REM (c) Acorn User
 February 1987
   50 :
   60 MODE 7
   70 PROCsetup
   80 PROCassemble
   90 PROCchecksum
  100 PROCkeyassign(keys
-&8000+M%)
  110 OSCLI "SRWRITE "+S
TR$~M%+" "+STR$~(O%)+" 8
000 7"
  120 PRINT'"Now press C
TRL-BREAK and then"
  130 PRINT"load and run
 a program."
  140 END
  150 :
  160 DEF PROCsetup
  170 M%=&5000
  180 PRINT"Joystick ROM
"
  190 PRINT"============
"'
  200 PRINT"Busy creatin
g ROM...."'
  210 osbyte=&FFF4:oswrc
h=&FFEE
  220 osrdch=&FFE0:osnew
l=&FFE7
  230 oscli =&FFF7:gsini
t=&FFC2
  240 gsread=&FFC5
  250 title$="Joystick R
OM"
  260 version$="1.00"
  270 bytev=&20A:extv=&F
F0F
  280 evs=&D9F:zp=&AF:op
t=2
  290 ENDPROC
  300 :
  310 DEF PROCassemble
  320 FOR pass=0 TO opt
STEP opt
  330 P%=&8000 : O%=M%
  340 [OPT pass+4
  350 EQUB 0
  360 EQUW 0
  370 JMP serv
  380 EQUB &82
  390 EQUB cprt AND &FF
  400 EQUB 0
  410 EQUS title$
  420 EQUB 0
  430 EQUS version$
  440 EQUB 0
  450 .cprt
  460 EQUB 0
  470 EQUS "(C)"
  480 EQUS "1987 Acorn U
ser"
  490 EQUB 0
  500 :
  510 .serv
  520 PHP
  530 PHA
  540 PHX
  550 PHY
  560 CMP #&27
  570 BEQ setup
  580 CMP #9
  590 BNE out
  600 JMP help
  610 .out
  620 PLY
  630 PLX
  640 PLA
  650 PLP
  660 RTS
  670 .zout
  680 PLY
  690 PLX
  700 PLA
  710 LDA #0
  720 PLP
  730 RTS
  740 :
  750 .joy
  760 PHP
  770 CMP #129
  780 BNE notus
  790 CPY #&FF
  800 BNE notus
  810 PHX
  820 JSR bytecal
  830 STX zp-1
  840 PLX
  850 LDA #0
  860 STA zp
  870 TXA
  880 LDY #0
  890 SEC
  900 .loop
  910 ROL zp
  920 CMP keys,Y
  930 BEQ found
  940 INY
  950 CPY #6
  960 BNE loop
  970 :
  980 LDY #&FF
  990 LDA #129
 1000 BRA notus
 1010 :
 1020 .found
 1030 LDA #&1F
 1040 TRB &FE62
 1050 LDA &FE60
 1060 AND zp
 1070 PHP
 1080 LDA #0
 1090 PLP
 1100 BNE exit
 1110 DEC A
 1120 .exit
 1130 ORA zp-1
 1140 TAX
 1150 TAY
 1160 LDA #129
 1170 PLP
 1180 RTS
 1190 .return
 1200 PLP
 1210 .notus
 1220 PLP
 1230 JMP (bytev2)
 1240 .bytecal
 1250 JMP (bytev2)
 1260 .keys
 1270 EQUB -74     \ RETUR
N
 1280 EQUB -98     \ Z
 1290 EQUB -105    \ ?
 1300 EQUB -73     \ *
 1310 EQUB -67     \ X
 1320 .vector
 1330 EQUW 0
 1340 .bytev2
 1350 EQUW 0
 1360 .setup
 1370 LDA bytev
 1380 STA bytev2
 1390 LDA bytev+1
 1400 STA bytev2+1
 1410 LDA #extv MOD 256
 1420 STA bytev
 1430 LDA #extv DIV 256
 1440 STA bytev+1
 1450 LDA #joy MOD 256
 1460 STA evs+3*5
 1470 LDA #joy DIV 256
 1480 STA evs+(3*5)+1
 1490 LDA &F4
 1500 STA evs+(3*5)+2
 1510 JMP out
 1520 .print
 1530 PLA
 1540 STA zp
 1550 PLA
 1560 STA zp+1
 1570 .ploop
 1580 JSR dinc
 1590 LDY #0
 1600 LDA (zp),Y
 1610 BEQ pout
 1620 JSR oswrch
 1630 BRA ploop
 1640 .pout
 1650 LDA zp+1
 1660 PHA
 1670 LDA zp
 1680 PHA
 1690 RTS
 1700 .dinc
 1710 INC zp
 1720 BNE dincout
 1730 INC zp+1
 1740 .dincout
 1750 RTS
 1760 :
 1770 .help
 1780 JSR gsinit
 1790 BNE hend
 1800 JSR osnewl
 1810 JSR print
 1820 EQUS title$
 1830 EQUB 32
 1840 EQUS version$
 1850 EQUW &D0A
 1860 EQUB 0
 1870 JSR osnewl
 1880 .hend
 1890 JMP out
 1900 .end
 1910 ]
 1920 NEXT
 1930 ENDPROC
 1940 :
 1950 DEFPROCkeyassign(k
eys)
 1960 LOCAL J%,n,A%,a$
 1970 PRINT"Assign keys
for game:"
 1980 FOR J%=0 TO 4
```

Continued▶

◀Joystick emulator continued

```
 1990 READ a$
 2000 n=FNget(a$)
 2010 keys?J%=n
 2020 A%=INKEY(1):IF A%>
32 VDU A%
 2030 PRINT" (";n;")"
 2040 *FX15
 2050 NEXT
 2060 ENDPROC
 2070 :
 2080 DEF FNget(a$)
 2090 LOCAL I%
 2100 PRINT"Press the ke
y for ";a$;" : ";
 2110 I%=127
 2120 IF INKEY-I% THEN 2
160
 2130 I%=I%-1
 2140 IF I%=0 THEN I%=12
7
 2150 GOTO 2120
 2160 REPEAT UNTIL INKEY
-I%=0
 2170 =-I%
 2180 :
 2190 DEF PROCchecksum
 2200 ct%=0
 2210 FOR loop=&5000 TO
&510D
 2220 ct%=ct%+?loop
 2230 NEXT
 2240 IF ct%=29650 THEN
ENDPROC
 2250 PRINT"Assembler er
ror."
 2260 PRINT"Check your l
isting."
 2270 VDU 7
 2280 END
 2290 :
 2300 DATA fire,left,dow
n,up,right
```

See A Stitch in Time, page 88

Cross Stitch embroidery listing 1

```
   10 REM Cross Stitch -
 Listing 1
   20 REM by Anneke Sich
erer-Roetman
   30 REM BBC B/B+/M/C/E
   40 REM (c) Acorn User
 February 1987
   50 :
   60 PROCpage
   70 MODE 1
   80 PROCinitialise
   90 PROCchars
  100 PROCassemble
  110 PROCcolours
  120 PROCchecksum
  130 CHAIN "ST2"
  140 END
  150 :
  160 DEF PROCinitialise
  170 VDU 19,3,4,0,0,0
  180 COLOUR 1:COLOUR 13
0
  190 PRINTTAB(10,2)SPC(
18)
  200 PRINTTAB(10,3)" *
Cross Stitch * "
  210 PRINTTAB(10,4)SPC(
18)
  220 COLOUR 3
  230 PRINTTAB(10,27)SPC
(18)
  240 PRINTTAB(10,28)" *
 Acorn User   * "
  250 PRINTTAB(10,29)SPC
(18)
  260 COLOUR 128
  270 PRINTTAB(12,10)"Us
e with:"
  280 COLOUR 2
  290 PRINTTAB(12,14)"1.
 Lightpen"
  300 PRINTTAB(12,16)"2.
 Joystick"
  310 PRINTTAB(12,18)"3.
 Cursor keys"
  320 COLOUR 1
  330 PRINTTAB(12,21)"Yo
ur choice ? ";
  340 REPEAT
  350 M%=GET-48
  360 UNTIL (M%>=1 AND M
%<=3)
  370 COLOUR 2:PRINT STR
$(M%)
  380 :
  390 REM make cursor in
visible
  400 VDU 23;8202;0;0;0;
  410 :
  420 REM lower OSHWM to
 &1800
  430 *FX179,24,0
  440 :
  450 REM reserve extra
 UDC space
  460 *FX20,1

  470 :
  480 REM load machine c
ode screendump
  490 *LOAD SDUMP 900
  500 ENDPROC
  510 :
  520 DEF PROCchars
  530 REM pattern charac
ters
  540 :
  550 VDU 23,128,&80,&80
,&80,&80,&80,&80,&80,&FF
  560 VDU 23,129,&80,&A2
,&A6,&AA,&B2,&A2,&80,&FF
  570 VDU 23,130,&80,&9C
,&9C,&BE,&9C,&9C,&80,&FF
  580 VDU 23,131,&80,&9C
,&BE,&BE,&BE,&9C,&80,&FF
  590 VDU 23,132,&80,&9C
,&A2,&AA,&A2,&9C,&80,&FF
  600 VDU 23,133,&80,&9C
,&A2,&A2,&A2,&9C,&80,&FF
  610 VDU 23,134,&80,&94
,&BE,&94,&BE,&94,&80,&FF
  620 VDU 23,135,&80,&88
,&88,&BE,&88,&88,&80,&FF
  630 VDU 23,136,&80,&88
,&94,&94,&A2,&BE,&80,&FF
  640 VDU 23,137,&80,&A2
,&84,&88,&90,&A2,&80,&FF
  650 VDU 23,138,&80,&80
,&84,&84,&9C,&80,&80,&FF
  660 VDU 23,139,&80,&88
,&94,&A2,&94,&88,&80,&FF
  670 VDU 23,140,&80,&94
,&9C,&BE,&BE,&A2,&80,&FF
  680 VDU 23,141,&80,&8E
,&8E,&88,&B8,&B8,&80,&FF
  690 VDU 23,142,&80,&94
,&88,&94,&88,&94,&80,&FF
  700 VDU 23,143,&80,&A2
,&A2,&BE,&A2,&A2,&80,&FF
  710 VDU 23,144,&80,&82
,&86,&8A,&92,&BE,&80,&FF
  720 VDU 23,145,&80,&AA
,&AA,&AA,&AA,&AA,&80,&FF
  730 VDU 23,146,&80,&A0
,&A0,&BE,&82,&82,&80,&FF
  740 VDU 23,147,&80,&94
,&94,&94,&94,&94,&80,&FF
  750 VDU 23,148,&80,&80
,&A2,&94,&88,&80,&80,&FF
  760 VDU 23,149,&80,&AA
,&9C,&B6,&9C,&AA,&80,&FF
  770 VDU 23,150,&80,&BE
,&BE,&BE,&BE,&BE,&80,&FF
  780 VDU 23,151,&80,&88
,&9C,&88,&BE,&88,&80,&FF
  790 VDU 23,152,&80,&A2
,&94,&88,&94,&A2,&80,&FF
  800 VDU 23,153,&80,&88
,,&88,&9C,&9C,&BE,&80,&FF
  810 VDU 23,154,&80,&88
,&9C,&BE,&9C,&88,&80,&FF
  820 VDU 23,155,&80,&A2
,&96,&8E,&9E,&BE,&80,&FF
  830 VDU 23,156,&80,&94
,&94,&AA,&AA,&A2,&80,&FF
  840 VDU 23,157,&80,&80
,&88,&94,&A2,&80,&80,&FF
  850 :
  860 REM other characte
rs
  870 VDU 23,158,&FF,&81
,&81,&81,&81,&81,&81,&FF
  880 VDU 23,159,&08,&08
,&08,&7F,&08,&08,&08,&00
  890 VDU 23,160,&55,&00
,&55,&00,&55,&00,&55,&00
  900 VDU 23,161,&2A,&00
,&2A,&00,&2A,&00,&2A,&00
  910 VDU 23,162,&00,&55
,&00,&55,&00,&55,&00,&00
  920 VDU 23,163,&00,&2A
,&00,&2A,&00,&2A,&00,&00
  930 VDU 23,164,&80,&80
,&80,&80,&80,&80,&80,&80
  940 VDU 23,165,&00,&00
,&00,&00,&00,&00,&00,&80
  950 ENDPROC
  960 :
  970 DEF PROCassemble
```

Continued▶

◀ *Cross Stitch* listing 1 continued

```
  980 oswrch=&FFEE
  990 xlo=&70:xhi=&71
 1000 ylo=&72:yhi=&73
 1010 colour=&7E
 1020 paddr1=&80:paddr2=
&81
 1030 paddr3=&84:paddr4=
&87
 1040 FOR pass%=0 TO 2 S
TEP 2
 1050 P%=&1300
 1060 :
 1070 [OPT pass%
 1080 \ VDU 5
 1090 LDA #5
 1100 JSR oswrch
 1110 \
 1120 \ address of param
 block (&600)
 1130 LDA #6
 1140 STA xhi
 1150 LDA #0
 1160 STA xlo
 1170 \
 1180 \ move addr to zer
o page
 1190 LDY #9
 1200 .address
 1210 LDA (xlo),Y
 1220 STA paddr1,Y
 1230 DEY
 1240 BPL address
 1250 \
 1260 \ parameters to ze
ro page
 1270 LDY #1
 1280 .param
 1290 LDA (paddr2),Y
 1300 STA xlo,Y
 1310 LDA (paddr3),Y
 1320 STA ylo,Y
 1330 DEY
 1340 BPL param
 1350 \
 1360 \ get colour numbe
r
 1370 INY
 1380 LDA (paddr4),Y
 1390 TAY
 1400 LDA colourtable,Y
 1410 STA colour
 1420 \
 1430 \ print 4 characte
rs at x,y
 1440 LDY #3
 1450 .loop
 1460 CLC
 1470 LDA colour
 1480 CPY #0
 1490 BEQ c0
 1500 CPY #1
 1510 BEQ c1
 1520 CPY #2
 1530 BEQ c2
 1540 LSR A
 1550 LSR A
 1560 .c2 LSRA
 1570 LSRA
 1580 .c1 LSRA
 1590 LSRA
 1600 .c0 AND #3
 1610 TAX
 1620 JSR move
 1630 JSR gcol
 1640 JSR print
 1650 DEY
 1660 BPL loop
 1670 \
 1680 \ VDU 4 and back t
o Basic
 1690 LDA #4
 1700 JSR oswrch
 1710 RTS
 1720 \
 1730 .move
 1740 LDA #25
 1750 JSR oswrch
 1760 LDA #4
 1770 JSR oswrch
 1780 LDA xlo
 1790 JSR oswrch
 1800 LDA xhi
 1810 JSR oswrch
 1820 LDA ylo
 1830 JSR oswrch
 1840 LDA yhi
 1850 JSR oswrch
 1860 RTS
 1870 \
 1880 .gcol
 1890 LDA #18
 1900 JSR oswrch
 1910 LDA #0
 1920 JSR oswrch
 1930 TXA
 1940 JSR oswrch
 1950 RTS
 1960 \
 1970 .print
 1980 CLC
 1990 TYA
 2000 ADC #160
 2010 JSR oswrch
 2020 RTS
 2030 \
 2040 .colourtable
 2050 ]
 2060 NEXT pass%
 2070 ENDPROC
 2080 :
 2090 DEF PROCcolours
 2100 FOR location%=P% T
O P%+29
 2110 byte%=0
 2120 FOR b%=0 TO 3
 2130 READ colournumber%
 2140 byte%=byte%+colour
number%*2^(2*b%)
 2150 NEXT b%
 2160 ?location%=byte%
 2170 NEXT location%

 2180 :
 2190 REM colour mixing
data
 2200 DATA 0,0,0,0, 1,1,
0,1, 3,1,1,1
 2210 DATA 1,1,1,1, 1,1,
2,1, 1,2,2,1
 2220 DATA 1,2,2,2, 2,1,
0,2, 2,2,2,2
 2230 DATA 2,2,0,2, 2,0,
0,2, 0,0,1,0
 2240 DATA 1,0,0,1, 1,2,
0,1, 0,1,2,0
 2250 DATA 2,2,3,2, 2,1,
3,2, 2,3,0,2
 2260 DATA 2,3,3,2, 3,0,
0,0, 3,0,0,3
 2270 DATA 3,3,0,3, 3,3,
3,3, 3,3,1,3
 2280 DATA 3,1,0,3, 3,1,
1,3, 1,2,3,1
 2290 DATA 1,3,0,1, 0,1,
3,0, 1,2,3,0
 2300 ENDPROC
 2310 :
 2320 DEFPROCchecksum
 2330 C%=0
 2340 FOR P%=&1300 TO &1
390
 2350 C%=C%+?P%
 2360 NEXT P%
 2370 IF C%<>17746 THEN
PRINT "Error in assemble
r listing":END
 2380 C%=0
 2390 FOR P%=&1391 TO &1
3AE
 2400 C%=C%+?P%
 2410 NEXT P%
 2420 IF C%<>3682 THEN P
RINT "Error in data line
s":END
 2430 ENDPROC
 2440 :
 2450 DEF PROCpage
 2460 *TV 0,1
 2470 IF PAGE=&1900 ENDP
ROC
 2480 CLS
 2490 PRINT" Set PAGE=&1
900 and reload."
 2500 END
```

Listing 2. Packed listing

```
   10 REM Cross Stitch -
 Listing 2
   20 REM Packed listing
 not to AU style
   30 :
   40 ONERRORGOTO2340
   50 PROCinit
   60 REPEAT
   70 PROCpattern
   80 IFC%=1CLS:END
   90 PROCdesign
  100 UNTILFALSE
  110 END
  120 :
  130 DEFPROCinit
  140 mix%=&1300
  150 osbyte=&FFF4:oscli
=&FFF7
  160 r$=CHR$164+CHR$11+
CHR$8+CHR$8+"_"+CHR$165
  170 ss$=CHR$128+r$+CHR
$10+CHR$8+CHR$128+r$
  180 pat%=mix%+&100:vdu
%=mix%+&490
  190 count%=mix%+&494:c
om%=mix%+&4B4
```

Continued ▶

◀ ***Cross Stitch*** **Listing 2 continued**

```
  200 PROCwipe:col%=3:cO
%=7:c3%=4:?vdu%=1
  210 IFM%=2x%=39-ADVAL1
DIV1638:y%=31-ADVAL2DIV2
048
  220 IFM%<>2 x%=15:y%=1
5
  230 ox%=x%:oy%=y%
  240 ENDPROC
  250 DEFPROCpattern
  260 CLS:PROCscreenP:PR
OCmenuP
  270 REPEAT:PROCmainP:U
NTILC%=1ORC%=2
  280 ENDPROC
  290 DEFPROCdesign
  300 CLS:PROCscreenD:PR
OCmenuD
  310 REPEAT:PROCmainD:U
NTILC%=2
  320 ENDPROC
  330 DEFPROCscreenP
  340 VDU19,3,0,0,0,0,19
,0,7,0,0,0
  350 FORH%=0TO29:count%
?H%=0:NEXT
  360 GCOLO,3:MOVE1023,1
023:DRAW1023,0
  370 MOVE32,992:DRAW992
,992
  380 MOVE992,992:DRAW99
2,32:COLOUR3
  390 FORJ%=0TO29:JJ%=J%
*30
  400 PRINTTAB(1,1+J%);
  410 FORH%=0TO29:VDU(12
8+pat%?(H%+JJ%))
  420 count%?(pat%?(H%+J
J%))=count%?(pat%?(H%+JJ
%))+1
  430 NEXT:NEXT
  440 ENDPROC
  450 DEFPROCmenuP
  460 COLOUR1:PRINTTAB(3
3,1)"CROSS"
  470 PRINTTAB(33,2)"STI
TCH"
  480 COLOUR3:PRINTTAB(3
3,4)" Acorn"
  490 PRINTTAB(34,5)"Use
r"
  500 COLOUR1:PRINTTAB(3
3,14)"*MENU*"
  510 GCOLO,3:FORJ%=528T
O16STEP-64
  520 MOVE1023,J%:DRAW12
79,J%:NEXT
  530 RESTORE2240
  540 FORJ%=16TO30STEP2:
COLOUR1
  550 PRINTTAB(32,J%)CHR
$158:COLOUR3
  560 READname$:PRINTTAB
(33,J%);name$;
  570 NEXT:PROCprcr(x%,y
%)
  580 ENDPROC
  590 DEFPROCmainP
  600 C%=0:REPEAT
  610 REPEAT:PROCcoords
  620 UNTILx%>31ANDy%>15
ANDy%MOD2=0
  630 PROCselectP
  640 UNTILC%=1ORC%=2
  650 ENDPROC
  660 DEFPROCscreenD
  670 PROCvdu
  680 GCOLO,1:MOVE1023,1
023:DRAW1023,0
  690 GCOLO,2:MOVE32,992
:DRAW992,992
  700 MOVE992,992:DRAW99
2,32:COLOUR2
  710 FORJ%=0TO29:JJ%=J%
*30
  720 PRINTTAB(1,1+J%);
  730 FORH%=0TO29
  740 VDU128:cl%=pat%?(H
%+JJ%)
  750 IFcl%=0THEN790
  760 xx%=H%*32+32:yy%=1
023-J%*32-32
  770 IFxx%<32 xx%=960:y
y%=yy%+32
  780 CALLmix%,xx%,yy%,c
l%
  790 NEXT:NEXT
  800 ENDPROC
  810 DEFPROCmenuD
  820 GCOLO,1:MOVE1151,1
023:DRAW1151,0
  830 FORJ%=976TO16STEP-
64
  840 MOVE1023,J%:DRAW12
79,J%:NEXT
  850 COLOUR1
  860 PRINTTAB(34,0)"P";
TAB(38,0)"M"
  870 COLOUR2:PRINTTAB(3
3,0)CHR$254
  880 PRINTTAB(37,0)CHR$
254
  890 cl%=0:COLOUR2
  900 FORH%=34TO38STEP4
  910 FORJ%=2TO30STEP2
  920 cl%=(cl%+1)MOD30
  930 xx%=H%*32:yy%=1023
-J%*32
  940 CALLmix%,xx%,yy%,c
l%
  950 VDU5:GCOLO,2
  960 MOVExx%-32,yy%:PRI
NTss$:VDU4
  970 NEXT:NEXT
  980 PROCprintcol(1):PR
OCprcr(x%,y%)
  990 ENDPROC
 1000 DEFPROCmainD
 1010 C%=0:REPEAT:PROCco
ords
 1020 IFx%>31 PROCselect
D ELSEPROCpaint
 1030 UNTILC%=2
 1040 ENDPROC
 1050 DEFPROCselectP
 1060 SOUND1,-15,100,2:C
%=(y%-16)DIV2+1
 1070 IFC%=3PROCosdfs("L
oad: ","LOAD "," "+STR$~
pat%):PROCscreenP
 1080 IFC%=4PROCosdfs("S
ave: ","SAVE "," "+STR$~
pat%+" "+STR$~(pat%+&400
))
 1090 IFC%=5PROCprint
 1100 IFC%=6PROClegenda:
PROCscreenP:PROCmenuP
 1110 IFC%=7PROCwipe:PRO
CscreenP
 1120 IFC%=8PROCosdfs("*
","","")
 1130 ENDPROC
 1140 DEFPROCselectD
 1150 IFy%MOD2 ENDPROC
 1160 SOUND1,-15,100,2
 1170 C%=y%DIV2+(x%DIV36
)*16
 1180 IFC%=0 ?vdu%=(?vdu
%+1)MOD4:PROCvdu:ENDPROC
 1190 IFC%=16 C%=2:ENDPR
OC
 1200 PROCprintcol(0):co
l%=C%-C%DIV16
 1210 PROCprintcol(1):C%
=0
 1220 ENDPROC
 1230 DEFPROCpaint
 1240 IFx%<1ORx%>30ORy%>
30ORy%<1 ENDPROC
 1250 SOUND1,-15,60,2:PR
OCprcr(x%,y%)
 1260 IFcol%=30 col%=0
 1270 pat%?(x%-1+(y%-1)*
30)=col%
 1280 xx%=x%*32:yy%=1023
-32*y%
 1290 CALLmix%,xx%,yy%,c
ol%
 1300 PROCprcr(x%,y%)
 1310 ENDPROC
 1320 DEFPROCosdfs(in$,c
$,a$)
 1330 X%=com%MOD256:Y%=c
om%DIV256
 1340 VDU28,33,12,39,10:
COLOUR1:PRINTin$;
 1350 PRINT:*FX21,0
 1360 INPUT""w$:$com%=c$
+w$+a$
 1370 CALLoscli:CLS:VDU2
6
 1380 ENDPROC
 1390 DEFPROCprint
 1400 VDU5:VDU26:CALL&90
0:VDU4
 1410 ENDPROC
 1420 DEFPROClegenda
 1430 IF?vdu%=0RESTORE22
60
 1440 IF?vdu%=1RESTORE22
80
 1450 IF?vdu%=2RESTORE23
00
 1460 IF?vdu%=3RESTORE23
20
 1470 GCOLO,3:K%=0
 1480 REPEAT:CLS
 1490 MOVE1023,1023:DRAW
1023,0:COLOUR1
 1500 PRINTTAB(33,10)"PR
INT?":COLOUR3
 1510 PRINTTAB(33,12)"YE
S";TAB(33,14)"NO"
 1520 PRINTTAB(0,1);:REP
EAT:K%=K%+1
 1530 READname$
```

Continued ▶

◀ *Cross Stitch* listing 2 continued

```
1540 IFcount%?K%>0 PRINT" ";CHR$(128+K%);r$;CHR$10;name$;TAB(25);"(";STR$count%?K%;")"'
1550 UNTILK%=29ORVPOS>30
1560 PROCprcr(x%,y%)
1570 REPEAT:PROCcoords:UNTILx%>31
1580 SOUND1,-15,100,2
1590 IFy%=11ORy%=12 PROCprint
1600 UNTILK%=29:CLS
1610 ENDPROC
1620 DEFPROCwipe
1630 FORH%=0TO899 STEP4:pat%!H%=0:NEXT
1640 ENDPROC
1650 DEFPROCvdu
1660 IF?vdu%=0 c0%=7:c3%=4
1670 IF?vdu%=1 c0%=6:c3%=0
1680 IF?vdu%=2 c0%=7:c3%=2
1690 IF?vdu%=3 c0%=6:c3%=7
1700 VDU19,0,c0%,0,0,0,19,3,c3%,0,0,0
1710 ENDPROC
1720 DEFPROCprintcol(k%)
1730 PROCprcr(x%,y%):GCOLO,k%:VDU5
1740 MOVE(33+col%DIV16*4)*32,1023-(col%MOD16+col%DIV16)*64
1750 PRINT"*";:VDU4:PROCprcr(x%,y%)
1760 ENDPROC
1770 DEFPROCcoords
1780 IFM%=1 PROCpen
1790 IFM%=2 PROCstick
1800 IFM%=3 PROCkeys
1810 ENDPROC
1820 DEFPROCpen
1830 REPEAT
1840 A%=150:X%=1
1850 *FX151,0,16
1860 R%=(USRosbyte DIV&FFFF)AND&FF
1870 *FX151,0,17
1880 r%=(USRosbyte DIV&FFFF)AND&FF
1890 R%=256*R%+r%-1542
1900 x%=(R%MOD80)DIV2+1
1910 y%=R%DIV80
1920 UNTILADVAL1DIV256>20
1930 ENDPROC
1940 DEFPROCstick
1950 REPEAT
1960 x%=39-ADVAL1DIV1638
1970 y%=31-ADVAL2DIV2048
1980 IFx%<>ox%ORy%<>oy% PROCmvcr
1990 UNTILADVALOAND3
2000 ENDPROC
2010 DEFPROCkeys
2020 REPEAT
2030 step%=1-3*INKEY(-1)
2040 x%=x%+step%*(INKEY(-26)-INKEY(-122))
2050 y%=y%-step%*(INKEY(-42)-INKEY(-58))
2060 IFx%<0 x%=0
2070 IFx%>39 x%=39
2080 IFy%<0 y%=0
2090 IFy%>31 y%=31
2100 IFx%<>ox%ORy%<>oy% PROCmvcr
2110 UNTILINKEY(-99)
2120 ENDPROC
2130 DEFPROCmvcr
2140 PROCprcr(ox%,oy%)
2150 PROCprcr(x%,y%)
2160 ox%=x%:oy%=y%
2170 ENDPROC
2180 DEFPROCprcr(X%,Y%)
2190 IFM%=1 ENDPROC
2200 GCOL3,1:VDU5
2210 MOVE32*X%,1023-32*Y%
2220 PRINT"+":VDU4
2230 ENDPROC
2240 DATA QUIT,DESIGN,LOAD,SAVE
2250 DATA PRINT,LEGEND,WIPE,OSCALL
2260 DATA rose-red,purple-red,red,orange-red,orange,orange-yellow,beige,yellow,light-yellow,cream,lilac,rose,light-brown,brown-yellow
2270 DATA yellow-green,brown,grey,grey-blue,v.light-blue,light-blue,blue,dark-blue,purple-blue,blue-purple,purple,rust,light-purple,violet,rose-grey
2280 DATA rose-red,brick-red,red,orange-red,orange,orange-yellow,beige,yellow,green-yellow,sea-green,light-purple,violet,light-brown,grey
2290 DATA dark-yellow,brown,blue-green,yellow-green,light-blue,blue,dark-blue,black,dark-red,purple,grey-red,dark-brown,dark-purple,grey-blue,grey-brown
2300 DATA rose-red,rust,red,orange-red,orange,orange-yellow,yellowish beige,yellow,light-yellow,cream,lilac,old-rose,light-brown,beige
2310 DATA green-yellow,olive-green,light-green,yellow-green,light-blue,sea-green,blue-green,grass-green,brown-green,grey-green,moss-green,tan,rose-grey,greenish grey,l. moss-green
2320 DATA purple-red,rose-red,red,orange-red,orange,orange-yellow,beige,yellow,green-yellow,sea-green,blue,purple,rust,grey,light-yellow
2330 DATA light-orange,yellow-green,cream,sky-blue,light-blue,v.light-blue,white,rose,lilac,dark-rose,tan,violet,blue-purple,light-brown
2340 REPORT:REPEATUNTIL GET
2350 VDU26:GOTO60
```

Listing 3. File creator

```
10 REM File Creator - Listing 3
20 REM by Anneke Sicherer-Roetman
30 REM BBC B/B+/M/C/E
40 REM (c) Acorn User February 1987
50 :
60 IF PAGE<>&1900 THEN PRINT"Reset PAGE=&1900":END
70 DIM com% 30:mix%=&1300
80 PROCdata("BFLY")
90 PROCdata("APPLE")
100 PRINT"Ready"
110 END
120 :
130 DEF PROCdata(S$)
140 PRINT"Busy with ";S$
150 FOR J%=0 TO 899
160 READ byte%
170 mix%?(&100+J%)=byte%
180 NEXT J%
190 READ byte%
200 mix%?&490=byte%
210 PROCsave(S$)
220 ENDPROC
230 :
240 DEF PROCsave(S$)
250 X%=com% MOD 256:Y%=com% DIV 256
260 $com%="SAVE "+S$+" "+STR$~(mix%+&100)+" +400"
270 CALL &FFF7
280 ENDPROC
290 :
300 REM data for butterfly
310 DATA 0,0,0,0,0,0,0,0,0,0
```

Continued ▶

◀ *Cross Stitch* listing 3 continued

```
 320 DATA 0,22,22,0,0,0
,0,0,0,0
 330 DATA 0,0,0,0,0,0,0
,0,0,0
 340 DATA 0,0,0,0,0,0,0
,0,0,0
 350 DATA 22,8,8,22,0,0
,0,0,0,0
 360 DATA 0,0,0,0,0,0,0
,0,0,0
 370 DATA 0,0,0,0,0,0,0
,0,0,22
 380 DATA 8,22,22,8,0,0
,0,0,0,0
 390 DATA 0,0,0,0,0,0,0
,0,0,0
 400 DATA 0,0,0,0,0,0,0
,0,22,8
 410 DATA 22,8,8,8,22,0
,0,0,0,0
 420 DATA 0,0,0,0,0,0,0
,0,0,0
 430 DATA 0,0,0,0,0,0,0
,22,8,22
 440 DATA 8,8,8,22,8,0,
0,0,0,0
 450 DATA 0,0,0,0,0,0,0
,0,0,0
 460 DATA 0,0,0,0,0,0,0
,22,22,22
 470 DATA 8,8,22,8,8,0,
0,0,0,0
 480 DATA 0,0,0,0,0,0,0
,0,0,0
 490 DATA 0,0,0,0,0,0,0
,22,8,22
 500 DATA 8,8,22,22,22,
0,0,0,0,0
 510 DATA 0,0,0,0,0,0,0
,0,0,0
 520 DATA 0,0,0,0,0,0,0
,22,22,22
 530 DATA 8,8,22,8,8,0,
0,0,0,0
 540 DATA 0,0,0,0,0,0,0
,0,0,0
 550 DATA 0,0,0,0,0,0,0
,22,8,22
 560 DATA 8,8,22,8,8,0,
0,0,0,0
 570 DATA 0,0,0,0,0,0,0
,0,0,0
 580 DATA 0,0,0,0,0,0,0
,0,22,8
 590 DATA 8,8,22,22,22,
0,0,0,0,0
 600 DATA 0,0,0,0,0,0,0
,0,0,0
 610 DATA 0,0,0,0,22,22
,22,22,0,8
 620 DATA 8,8,8,22,22,0
,0,22,0,0
 630 DATA 0,0,0,0,0,0,0
,0,0,0
 640 DATA 0,0,0,22,19,2
2,8,8,8,0
 650 DATA 8,8,22,22,22,
0,22,0,0,0
 660 DATA 0,0,0,0,0,0,0
,0,0,0
 670 DATA 0,0,22,19,22,
8,8,8,8,8
 680 DATA 8,13,13,13,22
,0,22,0,0,22
 690 DATA 0,0,0,0,0,0,0
,0,0,0
 700 DATA 0,22,19,22,8,
8,8,22,22,8
 710 DATA 8,13,13,13,13
,22,22,22,22,0
 720 DATA 0,0,0,0,0,0,0
,0,0,0
 730 DATA 0,22,22,22,8,
8,22,8,8,22
 740 DATA 8,13,13,13,22
,22,22,0,0,0
 750 DATA 0,0,0,0,0,0,0
,0,0,0
 760 DATA 0,22,19,22,8,
8,22,8,8,8
 770 DATA 22,8,13,13,22
,22,13,22,22,22
 780 DATA 22,8,8,22,8,8
,22,0,0,0
 790 DATA 22,22,22,22,8
,8,8,13,8,8
 800 DATA 8,8,22,22,13,
13,13,13,22,22
 810 DATA 22,8,8,22,8,2
2,8,8,22,0
 820 DATA 0,22,19,8,3,8
,13,13,13,13
 830 DATA 13,22,22,22,1
3,13,13,13,22,8
 840 DATA 22,22,22,22,2
2,8,8,22,8,22
 850 DATA 0,0,8,8,8,13,
0,0,0,0
 860 DATA 22,22,22,8,8,
13,13,13,8,8
 870 DATA 8,8,8,8,8,8,8
,22,8,22
 880 DATA 0,0,0,0,0,0,0
,0,0,0
 890 DATA 22,22,13,8,22
,8,8,8,8,8
 900 DATA 8,8,8,8,8,8,2
2,8,22,0
 910 DATA 0,0,0,0,0,0,0
,0,0,22
 920 DATA 0,0,13,8,8,22
,8,8,0,8
 930 DATA 8,22,22,22,22
,22,8,22,0,0
 940 DATA 0,0,0,0,0,0,0
,0,22,0
 950 DATA 0,0,13,8,8,8,
22,8,8,0
 960 DATA 22,8,22,8,22,
8,22,0,0,0
 970 DATA 0,0,0,0,0,0,0
,0,0,0
 980 DATA 0,0,13,13,8,8
,22,8,8,22
 990 DATA 0,22,22,22,22
,22,0,0,0,0
 1000 DATA 0,0,0,0,0,0,0
,0,0,0
 1010 DATA 0,0,13,8,22,2
2,8,8,8,22
 1020 DATA 0,0,0,0,0,0,0
,0,0,0
 1030 DATA 0,0,0,0,0,0,0
,0,0,0
 1040 DATA 0,13,8,8,8,8,
8,8,22,22
 1050 DATA 0,0,0,0,0,0,0
,0,0,0
 1060 DATA 0,0,0,0,0,0,0
,0,0,0
 1070 DATA 0,8,3,8,8,8,8
,22,19,22
 1080 DATA 0,0,0,0,0,0,0
,0,0,0
 1090 DATA 0,0,0,0,0,0,0
,0,0,0
 1100 DATA 0,8,8,22,22,2
2,22,19,22,0
 1110 DATA 0,0,0,0,0,0,0
,0,0,0
 1120 DATA 0,0,0,0,0,0,0
,0,0,0
 1130 DATA 0,8,19,22,19,
22,19,22,0,0
 1140 DATA 0,0,0,0,0,0,0
,0,0,0
 1150 DATA 0,0,0,0,0,0,0
,0,0,0
 1160 DATA 0,0,22,22,22,
22,22,0,0,0
 1170 DATA 0,0,0,0,0,0,0
,0,0,0
 1180 DATA 0,0,0,0,0,0,0
,0,0,0
 1190 DATA 0,0,0,22,0,0,
0,0,0,0
 1200 DATA 0,0,0,0,0,0,0
,0,0,0
 1210 DATA 1
 1220 REM data for apple
 1230 DATA 0,25,25,25,25
,25,25,0,0,0
 1240 DATA 0,0,0,0,0,0,0
,0,0,2
 1250 DATA 2,0,0,0,0,0,0
,0,0,0
 1260 DATA 0,0,23,23,23,
23,25,26,26,25
 1270 DATA 0,0,0,0,0,0,0
,0,2,2
 1280 DATA 0,0,0,0,0,0,0
,0,0,0
 1290 DATA 0,0,0,0,0,23,
25,25,26,25
 1300 DATA 25,0,0,0,0,0,
0,2,2,0
 1310 DATA 0,0,0,0,0,0,0
,0,0,0
 1320 DATA 0,0,0,0,0,25,
23,23,25,26
 1330 DATA 26,25,0,0,0,0
,2,2,0,0
 1340 DATA 0,0,0,0,0,0,0
,0,25,25
 1350 DATA 0,0,0,0,0,0,0
,23,25,26
 1360 DATA 26,25,0,0,0,2
,2,0,0,0
 1370 DATA 0,0,0,0,23,23
,23,25,26,0
 1380 DATA 0,0,0,0,0,0,0
,25,23,25
 1390 DATA 26,25,0,0,0,2
,0,0,0,0
 1400 DATA 0,0,0,25,23,2
3,25,26,26,0
```

Continued ▶

◀ *Cross Stitch* listing 3 continued

```
1410 DATA 0,0,0,0,0,0,0
,23,23,23
1420 DATA 25,26,0,0,2,2
,2,0,0,0
1430 DATA 0,0,23,25,23,
25,26,26,0,0
1440 DATA 0,0,0,0,0,0,0
,0,23,23
1450 DATA 23,25,2,2,2,0
,2,0,0,0
1460 DATA 0,23,23,23,25
,26,26,0,0,0
1470 DATA 0,24,0,0,0,0,
0,0,0,25
1480 DATA 23,23,2,2,0,0
,2,2,0,0
1490 DATA 25,23,23,25,2
6,26,26,0,0,0
1500 DATA 0,24,24,24,24
,0,0,0,0,2
1510 DATA 2,2,0,0,0,0,0
,2,25,23
1520 DATA 23,25,25,26,2
6,26,0,0,0,0
1530 DATA 0,18,24,26,26
,24,0,0,2,2
1540 DATA 0,0,0,0,0,0,0
,2,0,25
1550 DATA 25,26,26,26,0
,0,0,0,0,0
1560 DATA 0,0,18,25,25,
25,0,0,2,0
1570 DATA 0,0,0,0,0,0,0
,2,25,23
1580 DATA 25,23,23,0,0,
0,0,0,0,0
1590 DATA 0,0,0,0,25,18
,25,2,2,0
1600 DATA 0,0,0,0,0,0,0
,2,25,23
1610 DATA 23,25,23,26,2
6,0,0,0,0,0
1620 DATA 0,0,0,0,0,0,0
,2,2,0
1630 DATA 0,0,0,0,5,5,5
,5,5,5
1640 DATA 23,23,25,23,2
3,23,23,0,0,0
1650 DATA 0,0,18,22,25,
25,2,2,0,0
1660 DATA 0,0,5,5,6,6,6
,6,5,5
1670 DATA 23,23,25,23,2
3,25,25,23,0,0
1680 DATA 0,15,26,26,25
,2,0,0,0,0
1690 DATA 0,5,5,6,6,8,6
,6,6,5
1700 DATA 23,23,23,25,2
3,23,23,25,0,0
1710 DATA 0,18,22,18,0,
23,0,0,0,0
1720 DATA 5,5,6,6,8,8,8
,8,6,6
1730 DATA 5,23,25,23,23
,25,25,23,23,0
1740 DATA 18,18,0,0,0,2
2,23,0,0,0
1750 DATA 5,5,6,8,10,10
,8,8,6,6
1760 DATA 5,23,25,23,25
,23,23,25,23,23
1770 DATA 0,0,0,0,0,22,
18,18,0,5
1780 DATA 5,5,6,8,10,10
,6,8,6,6
1790 DATA 5,5,5,4,23,23
,23,23,25,23
1800 DATA 0,0,0,0,0,0,2
3,18,0,5
1810 DATA 5,5,6,8,6,6,6
,8,6,6
1820 DATA 5,5,5,4,4,23,
23,23,24,25
1830 DATA 0,0,0,0,0,0,1
8,18,0,5
1840 DATA 5,5,6,8,8,6,8
,8,6,6
1850 DATA 5,5,4,4,4,3,3
,0,23,23
1860 DATA 0,0,0,0,0,0,0
,0,0,5
1870 DATA 5,5,6,6,8,8,8
,6,6,6
1880 DATA 5,4,5,4,4,3,3
,0,0,0
1890 DATA 0,0,0,0,0,0,0
,0,0,4
1900 DATA 5,5,5,6,6,6,6
,6,6,6
1910 DATA 5,5,5,4,4,3,3
,0,0,0
1920 DATA 0,0,0,0,0,0,0
,0,0,4
1930 DATA 5,5,5,5,6,6,6
,6,6,5
1940 DATA 5,4,5,4,4,3,3
,0,0,0
1950 DATA 0,0,0,0,0,0,0
,0,0,4
1960 DATA 4,5,5,5,5,5,5
,5,5,5
1970 DATA 5,5,5,4,4,3,3
,0,0,0
1980 DATA 0,0,0,0,0,0,0
,0,0,4
1990 DATA 4,4,5,5,4,4,5
,4,4,3
2000 DATA 3,5,4,4,3,3,0
,0,0,0
2010 DATA 0,0,0,0,0,0,0
,0,0,0
2020 DATA 4,4,4,5,5,5,5
,4,4,2
2030 DATA 3,4,4,4,3,0,0
,0,0,0
2040 DATA 0,0,0,0,0,0,0
,0,0,0
2050 DATA 0,4,4,4,4,4,4
,3,2,2
2060 DATA 3,4,4,3,0,0,0
,0,0,0
2070 DATA 0,0,0,0,0,0,0
,0,0,0
2080 DATA 0,0,4,4,4,4,4
,3,3,3
2090 DATA 3,4,4,0,0,0,0
,0,0,0
2100 DATA 0,0,0,0,0,0,0
,0,0,0
2110 DATA 0,0,0,0,4,4,4
,4,4,4
2120 DATA 4,0,0,0,0,0,0
,0,0,0
2130 DATA 2
>
```

See The Network Page, page 173

Listing 1. Network file pusher

```
10 REM Network File Pusher
20 REM by Scott Ling/Robin Newman
30 REM for BBC B/B+/M/C + Econet
40 REM (c) Acorn User February 1987
50 :
60 REM Preset data list of stations t
erminated by ""
70 DATA 1-5,8,10-12,""
80 :
90 IF PAGE<&E00 THEN PAGE=&E00:CHAIN"
PUSH"
100 MODE7
110 L%=1
120 a$=CHR$131+"1)"+CHR$133+"Push to a
ll stations."
130 b$=CHR$131+"2)"+CHR$132+"Push to a
ll stations Excl."
140 c$=CHR$131+"3)"+CHR$129+"Push to s
pecified stations."
150 d$=CHR$131+"4)"+CHR$134+"Push to p
```

Continued ▶

◀ *Network* listing 1 continued

```
reset list of stations."
160 DIM B% 254
170 osf%=&900
180 namebuf%=osf%+&18
190 pb%=namebuf%+&18
200 pg%=pb%+&30
210 cli%=pg%+1
220 !pb%=&FF05
230 PROCcall(19)
240 ?pb%=8
250 PROCcall(19)
260 sn%=pb%?1
270 E%=(HIMEM-(256*?&3))-&300
280 PROCs
290 DIMW% E%
300 ON ERROR PROCr:ON L% GOTO 310,450,
450,870:ELSE GOTO310
310 REPEAT
320 PROCo(1)
330 PRINT'CHR$131"Program filename ?"C
HR$133;
```

Continued ▶

◀ Network listing 1 continued

```
  340 INPUT""f$
  350 PROCo(0)
  360 IF LENf$<1 OR LENf$>21 VDU 7,12:UN
TILFALSE
  370 IF LEFT$(f$,1)="*" PROCC(f$):UNTIL
 FALSE
  380 PROCchk(f$)
  390 IF A%=0B$="**"+CHR$132+f$+CHR$129+
"Not found **  "+CHR$156:PROCr2(0):UNTIL
 FALSE
  400 IF A%=2 B$="**"+CHR$129+"That is a
 Directory name **  "+CHR$156:PROCr2(0):
UNTIL FALSE
  410 IF osf%?10>E% B$="** File too long
 **  "+CHR$156:PROCr2(0):UNTIL FALSE
  420 PROC1("LO. "+f$+" "+STR$~W%)
  430 L%=2
  440 *FX21
  450 PROCt1(0)
  460 REPEAT
  470 N%=GET-48
  480 UNTIL N%>0 AND N%<5
  490 PROCt1(N%)
  500 VDU28,0,24,39,13
  510 L%=3
  520 IF N%<3 S%=1ELSE S%=0
  530 FOR Z%=1 TO 254
  540 B%?Z%=S%
  550 NEXT
  560 IF N%=1 GOTO 710
  570 RESTORE
  580 REPEAT
  590 IF N%=3 OR N%=4 PRINT CHR$129"Push
 to Station(s):"CHR$131;:ELSEPRINTCHR$13
0"All,excluding station(s):";CHR$133;
  600 IF N%=4:READf$:PRINTf$
  610 IF N%=4 AND f$=""GOTO700 ELSE IFN%
=4 GOTO 630
  620 INPUTLINE""f$
  630 IF(INSTR(f$,",")<>0OR INSTR(f$,"-"
)<>0)PROCmu:GOTO700:ELSE IFf$=""GOTO 700
  640 J%=VALf$
  650 IF J%<1 OR J%>254 PROClarge:GOTO70
0
  660 IF N%<>3 AND N%<>4 GOTO0690:ELSE PR
OCnt(J%)
  670 IF R% PRINT'CHR$134;"Include (Y/N)
 ?";CHR$133;:IF NOT FNy PRINT:GOTO 700
  680 IF R% PRINT
  690 IF N%=3 OR N%=4 B%?J%=1:ELSE B%?J%
=0
  700 UNTILf$=""
  710 B%?sn%=0
  720 VDU28,0,24,39,5,12
  730 PRINT"Push to:";CHR$133;
  740 PROCfg
  750 IF O%=2 GOTO 780
  760 PRINT"All stations"
  770 IF O%=1 PRINT'CHR$134;TAB(1);"exce
pt:";CHR$133;
  780 Z%=0
  790 REPEAT
  800 Z%=Z%+1
  810 IF O%=2 AND B%?Z%=1 THEN PRINT RIG
HT$("00"+STR$(Z%),3);",";:GOTO 830
  820 IF O%=1 AND B%?Z%=0 THEN PRINT RIG
HT$("00"+STR$(Z%),3);",";
  830 IF POS>36 PRINT'CHR$133;
  840 UNTIL Z%=254 OR VPOS>16
  850 PRINT''CHR$131"Is this OK ? (Y/N)
";
  860 IF NOT FNy VDU7,12:PROCs:GOTO0450
  870 L%=4
  880 Q%=0
```

Continued ▶

◀ Network listing 1 continued

```
  890 B$="Specify load address"
  900 IF ?W%=13 AND(osf%?7=&80 OR osf%?7
=&B8) Q%=1:B$="Specify remote page"
  910 C%=0
  920 D%=((osf%!6) AND &FFFF)
  930 VDU11
  940 PRINT;CHR$131B$" ? (Y/N)"CHR$132;
  950 IF FNy PROCpage
  960 PRINT'CHR$131"Execute remote progr
ams ? (Y/N)"CHR$132
  970 U%=FNy
  980 CLS
  990 V%=0
 1000 REPEAT
 1010 V%=V%+1
 1020 IF B%?V%=0 GOTO1080
 1030 PROCnt(V%)
 1040 IF R% GOTO 1080
 1050 PROCprint("Program pushed to stati
on ",V%)
 1060 PROCstop(V%)
 1070 IF Q%=1 PROCba(V%) ELSE PROCmc(V%)
 1080 UNTIL V%=254
 1090 L%=1
 1100 PROCcont
 1110 PROCs
 1120 GOTO 310
 1130 DEF PROCs
 1140 VDU 28,0,24,39,0
 1150 PRINT TAB(7,0)CHR$141CHR$131"**"CH
R$132"Program Pusher"CHR$131"**"
 1160 PRINT TAB(7,1)CHR$141CHR$131"**"CH
R$132"Program Pusher"CHR$131"**"
 1170 PRINTTAB(10,3)"(C)"CHR$130"Acorn U
ser"CHR$135"1986"
 1180 PRINT''"Max file length: &";~E%
 1190 VDU 28,0,24,39,9
 1200 ENDPROC
 1210 DEF PROCt1(Z%)
 1220 CLS
 1230 PRINTSPC3;a$'SPC3;b$'SPC3;c$'SPC3;
d$
 1240 IF Z% PRINT TAB(0,Z%-1);CHR$136
 1250 ENDPROC
 1260 DEFPROCmu
 1270 T%=INSTR(f$."-")
 1280 IF T%=0 T%=INSTR(f$,",")
 1290 X%=VAL(LEFT$(f$,T%-1))
 1300 Y%=VAL(MID$(f$,T%+1))
 1310 IF X%<1 OR Y%<1 OR X%>254 OR Y%>25
4 PROClarge:ENDPROC
 1320 IF Y%<X% Y%=Y%+X%:X%=Y%-X%:Y%=Y%-X
%
 1330 IF N%=2 S%=0 ELSE S%=1
 1340 FOR Z%=X% TO Y%
 1350 R%=0
 1360 IF N%=3 OR N%=4 PROCnt(Z%):ELSE GO
TO1390
 1370 IF R% PRINT'CHR$134"Include (Y/N)
?";CHR$133;:IF NOT FNy PRINT:GOTO 1400
 1380 IF (N%=3 OR N%=4)AND R% PRINT
 1390 B%?Z%=S%
 1400 NEXT
 1410 IF(N%=3 OR N%=4)AND R% PRINT
 1420 ENDPROC
 1430 DEF PROCfg
 1440 O%=0
 1450 X%=0
 1460 Y%=0
 1470 V%=0
 1480 REPEAT
 1490 V%=V%+1
 1500 IF B%?V%=1 Y%=Y%+1:ELSE X%=X%+1
 1510 UNTIL V%=254
```

Continued ▶

◄ Network listing 1 continued

```
1520 IF Y%=254 ENDPROC
1530 IF Y%>X% O%=1:ENDPROC
1540 O%=2
1550 ENDPROC
1560 DEF PROCpp(Q%)
1570 ?pg%=0
1580 PROCpk(&81,Q%,pg%,pg%+1,&18)
1590 P%=EVAL("&"+STR$~(?pg%)+"00")
1600 ENDPROC
1610 DEF PROCpk(F%,H%,I%,K%,M%)
1620 pb%?0=F%
1630 pb%!2=H%
1640 pb%!4=I%
1650 pb%!8=K%
1660 pb%!12=M%
1670 pb%?1=0
1680 PROCcall(16)
1690 ENDPROC
1700 DEF PROCl(d$)
1710 $cli%=d$
1720 X%=cli% MOD 256
1730 Y%=cli% DIV 256
1740 CALL &FFF7
1750 ENDPROC
1760 DEF PROCtrm(d$,F%)
1770 pb%!1=F%
1780 $(pb%+3)=d$
1790 pb%?0=1
1800 PROCcall(20)
1810 ENDPROC
1820 DEF PROCo(T%)
1830 VDU 23,1,T%;0;0;0;
1840 ENDPROC
1850 DEF PROCcall(A%)
1860 X%=pb% MOD 256
1870 Y%=pb% DIV 256
1880 CALL &FFF1
1890 ENDPROC
1900 DEF PROClarge
1910 VDU 7
1920 PRINT'CHR$136;CHR$131;"** Bad stat
ion number **";CHR$137;"(1-254 only)"'
1930 ENDPROC
1940 DEF PROCnt(Q%):R%=0:PROCpp(Q%)
1950 IF P%=0 VDU 7:PRINT'CHR$131;"Stati
on";CHR$132;RIGHT$("00"+STR$(Q%),3);CHR$
131;"not listening.":R%=1
1960 ENDPROC
1970 DEF PROCprint(B$,T%)
1980 PRINT CHR$131;B$;CHR$132;RIGHT$("O
O"+STR$(T%).3)
1990 ENDPROC
2000 DEF PROCchk(d$)
2010 $namebuf%=d$
2020 !osf%=namebuf%
2030 A%=5
2040 X%=osf% MOD 256
2050 Y%=osf% DIV 256
2060 A%=(USR&FFDD)AND &FF
2070 ENDPROC
2080 DEF PROCr
2090 B$="** ERROR "+STR$ERR:B$=B$+" "+B
$+" ** "+CHR$156
2100 PROCr2(1)
2110 ENDPROC
2120 DEF PROCcont
2130 PRINT''''CHR$131;CHR$157;CHR$132;"
 ** Press any key to continue **   ";CHR
$156
2140 G%=GET
2150 CLS
2160 ENDPROC
2170 DEF PROCr2(f%)
2180 PROCo(0)
2190 A%=15
```

Continued ►

◄ Network listing 1 continued

```
2200 X%=0
2210 CALL &FFF4
2220 ENVELOPE1,1,4,-4,4,10,20,10,127,0,
0,-5,126,126
2230 IF L%=3 CLS
2240 VDU 28,0,24,39,9,12
2250 SOUND 1,1,100,20
2260 pl%=((40-LENB$)/2)-4
2270 VDU 31,pl%,2,141,131,136,157,129
2280 PRINT B$
2290 VDU 31,pl%,3,141,131,136,157,129
2300 PRINTB$
2310 IF f% PRINT':REPORT
2320 PROCcont
2330 VDU 28,0,24,39,9+(L%=4)*4,12
2340 ENDPROC
2350 DEF PROCC(B$)
2360 CLS
2370 VDU 14
2380 PROCl(B$)
2390 PRINT'CHR$131CHR$157CHR$132" ** Pr
ess any key to continue **   "CHR$156
2400 *FX21
2410 G%=GET
2420 VDU 15
2430 CLS
2440 ENDPROC
2450 DEF FNy
2460 *FX21
2470 REPEAT
2480 B$=CHR$(GET AND 223)
2490 UNTIL B$="Y"OR B$="N"
2500 PRINT B$
2510 IF B$="Y" =TRUE ELSE =FALSE
2520 DEF PROCpage
2530 IF Q%=1 B$="Remote Page"ELSEB$="Re
mote load address"
2540 PRINT'CHR$133 B$;" ? &";
2550 INPUT""f$
2560 C%=EVAL("&"+f$)
2570 PROCchek(C%)
2580 IF R% VDU 7:GOTO 2540
2590 IF Q%=0 D%=C%+((osf%!6 AND &FFFF)-
(osf%!2 AND &FFFF)):ENDPROC
2600 IFC%MOD256<>0VDU7:GOTO2540
2610 ENDPROC
2620 DEF PROCchek(T%)
2630 R%=0
2640 IF T%<&400 OR T%>&FFFF R%=1
2650 ENDPROC
2660 DEF PROCba(T%)
2670 IF C%=0 C%=P%
2680 PROCpk(&82,T%,W%,W%+(osf%!10 AND &
FFFF),C%)
2690 B$="PA.=&"+STR$~C%
2700 PROCtrm(B$,T%)
2710 PROCtrm("OLD",T%)
2720 IF U%<>0 PROCtrm("RUN",T%):PROCpri
nt(CHR$133+" **    Program Run    **    ",T
%)
2730 ENDPROC
2740 DEF PROCmc(T%)
2750 IF C%=0 C%=(osf%!2 AND &FFFF)
2760 PROCpk(&82,T%,W%,W%+(osf%!10 AND &
FFFF),C%)
2770 IFU%<>0PROCtrm("CALL&"+STR$~D%,T%)
:PROCprint(CHR$132+"** Program executed.
**  ",T%)
2780 ENDPROC
2790 DEF PROCstop(T%)
2800 ?pb%=2
2810 pb%!1=T%
2820 PROCcall(20)
2830 ENDPROC
```

See Hints & Tips, page 49

Listing 1. Gives co-ordinates on screen

```
  10 REM Listing 1
  20 REM Hints & Tips
  30 REM By Martin Phillips
  40 REM For BBC B/B+/M/C/E
  50 REM (c) Acorn User February 1987
  60 :
  70 MODE1
  80 PROCinitialise
  90 PROCaxes
 100 PROCcross
 110 REPEAT
 120 A=GET
 130 PROCcross
 140 IF A=136 AND X%>-400 THEN X%=X%-40
 150 IF A=137 AND X%<400 THEN X%=X%+40
 160 IF A=138 AND Y%>-400 THEN Y%=Y%-40
 170 IF A=139 AND Y%<400 THEN Y%=Y%+40
 180 PROCcross
 190 UNTIL 0
 200 :
 210 DEFPROCinitialise
 220 @%=0
 230 VDU29,640;512;
 240 X%=0:Y%=0
 250 *FX4,1
 260 *FX12,30
 270 *KEY0 *FX12|M *FX4|M MO.1|M |N L.|M
 280 ENDPROC
 290 :
 300 DEFPROCaxes
 310 PRINTTAB(0,15)"-X"TAB(39)"X"
 320 PRINTTAB(19,0)"Y"
 330 PRINTTAB(18,31)"-Y";
 340 VDU5
 350 MOVE -640,0:DRAW 640,0
 360 MOVE 0,-512:DRAW 0,512
 370 ENDPROC
 380 :
 390 DEFPROCcross
 400 GCOL 3,1
 410 MOVE 0,Y%:PLOT21,X%,Y%
 420 PLOT 21,X%,0
 430 MOVE X%-16,Y%+16:PRINT "x"
 440 GCOL 3,2
 450 IF Y%<0 THEN y=-48 ELSE y=48
 460 IF X%<0 THEN x=-148 ELSE x=16
 470 MOVE X%+x,Y%+y:PRINT X%/40","Y%/40
 480 ENDPROC
```

See It's all Greek, page 95

Listing 1. The Tree of Pythagoras

```
  10 REM Tree of Pythagoras
  20 REM by Albert Koelmans
  30 REM for BBC B/B+/M/C/E
  40 REM (C) Acorn User February 1987
  50 :
  60 MODE 4
  70 M%=640:L%=110:H%=0:delta=10.0:a=RA
D(45)
  80 MOVE M%-L%,H%:DRAW M%-L%,2*L%+H%
  90 DRAW M%+L%,2*L%+H%:DRAW M%+L%,H%
 100 DRAW M%-L%,H%
 110 PROCtree(M%-L%,2*L%+H%,M%+L%,2*L%+
H%,M%+L%*(-1+2*SIN(a)*SIN(a)),H%+2*L%*(1
+SIN(a)*COS(a)))
 120 END
 130 :
 140 DEF FNlngth(a,b,c,d)
 150 LOCAL e,f:e=a-c:f=b-d
 160 =SQR(e*e+f*f)
 170 :
 180 DEF FNangle(x,y)
```

continued ▶

◀ Tree of Pythagoras listing 1 continued

```
 190 IF ABS(x)>0.01 THEN 230
 200 IF ABS(y)<0.01 THEN =0
 210 IF y<0 THEN =1.5*PI
 220 =PI/2
 230 IF x<0 THEN =(ATN(y/x)+PI) ELSE =A
TN(y/x)
 240 :
 250 DEF PROCtree(c11,c12,c21,c22,c31,c
32)
 260 LOCAL v11,v12,v21,v22,e21,e22,e31,
e32,e51,e52,e61,e62,b,c,d,a2
 270 IF FNlngth(c11,c12,c21,c22)<=delta
 THEN ENDPROC
 280 v11=c32-c22:v12=c21-c31
 290 v21=c12-c32:v22=c31-c11
 300 e21=c31+v11:e22=c32+v12
 310 e31=c21+v11:e32=c22+v12
 320 e51=c31+v21:e52=c32+v22
 330 e61=c11+v21:e62=c12+v22
 340 MOVE c11,c12:DRAW e21,e22:DRAW e31
,e32
 350 DRAW c21,c22:DRAW e51,e52:DRAW e61
,e62
 360 DRAW c11,c12
 370 c11=e61:c12=e62:c21=e51:c22=e52
 380 v11=c21-c11:v12=c22-c12
 390 b=FNangle(v11,v12)
 400 a2=a
 410 c=a2-b
 420 d=SIN(a2)*SQR(v11*v11+v12*v12)
 430 v21=d*SIN(c):v22=d*COS(c)
 440 c31=c11+v21:c32=c12+v22
 450 PROCtree(c11,c12,c21,c22,c31,c32)
 460 c11=e21:c12=e22:c21=e31:c22=e32
 470 v11=c21-c11:v12=c22-c12
 480 b=FNangle(v11,v12)
 490 c=a2-b
 500 d=SIN(a2)*SQR(v11*v11+v12*v12)
 510 v21=d*SIN(c):v22=d*COS(c)
 520 c31=c11+v21:c32=c12+v22
 530 PROCtree(c11,c12,c21,c22,c31,c32)
 540 ENDPROC
```

Listing 2. Changes to listing 1

```
  10 REM Changes to Listing 1
  20 REM to produce Listing 2
  30 :
  70 M%=375:L%=90:H%=150:delta=15.0:a=R
AD(30)
```

Listing 3. Changes to listing 2

```
  10 REM Changes to Listing 2
  20 REM to produce Listing 3
  30 :
  70 M%=640:L%=60:H%=0:delta=10.0:a=RAD
(30)
 110 PROCtree(M%-L%,2*L%+H%,M%+L%,2*L%+
H%,M%+L%*(-1+2*SIN(a)*SIN(a)),H%+2*L%*(1
+SIN(a)*COS(a)),0)
 250 DEF PROCtree(c11,c12,c21,c22,c31,c
32,m%)
 400 IF m% MOD 2 = 0 THEN a2=PI/2-a ELS
E a2=a
 450 PROCtree(c11,c12,c21,c22,c31,c32,m
%+1)
 530 PROCtree(c11,c12,c21,c22,c31,c32,m
%+1)
```

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☐ JUL 0415-4	☐ JUL 0427-8	
☐ AUG 0416-2	☐ AUG 0428-6	
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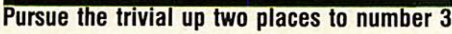
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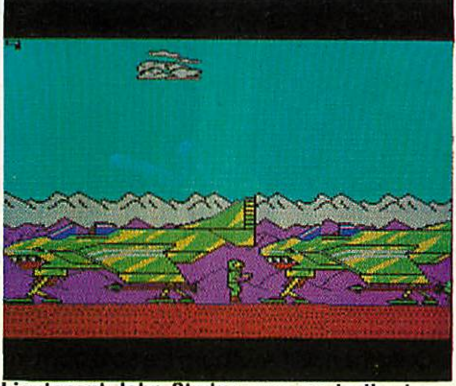
Check out the latest position of your favourite game

TOP 20 BBC MICRO GAMES

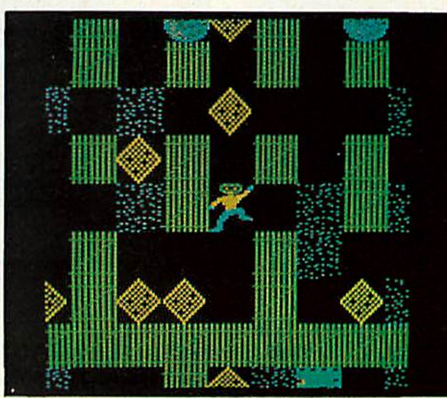
		Title	Publisher	Cassette	Disc	B+	Master	Compact	Reviewed
1	(2)	Stryker's Run	Superior	£9.95	£11.95	Yes	Yes	£14.95	January '87
2	(–)	Repton 3	Superior	£9.95	£11.95	Yes	Yes	£14.95	January '87
3	(5)	Trivial Pursuit	Domark	£14.95	£19.95	Yes	Yes	—	January '87
4	(7)	Commonwealth Games	Tynesoft	£6.95	£8.95	Yes	Yes	£9.95	—
5	(1)	Kane	Mastertronic	£1.99	—	No	No	—	—
6	(4)	Psycastria	Audiogenic	£7.99	£11.95	Yes	Yes	—	February '87
7	(8)	Micropower Magic	Micropower	£7.95	£7.95	Yes	Yes	—	—
8	(3)	Thrust	Superior	£7.95	£11.95	Yes	Yes	—	February '87
9	(12)	Jet Set Willy	Software Projects	£9.95	£11.95	Yes	Yes	—	—
10	(–)	Ravenskull	Superior	£9.95	£11.95	Yes	Yes	—	—
11	(14)	Phantom Combat	Doctorsoft	£9.95	£11.95	Yes	Yes	—	February '86
12	(11)	Winter Olympics	Tynesoft	£6.95	£8.95	Yes	Yes	£9.95	September '86
13	(–)	Computer Hits 10 Volume 3	Beau Jolly	£9.95	—	Yes	No	—	—
14	(–)	Crystal Castles	US Gold	£9.99	£14.99	*	*	—	—
15	(–)	Thunderstruck	Audiogenic	£7.95	—	*	*	—	—
16	(9)	Galaforce	Superior	£9.95	£11.95	Yes	Yes	£14.95	December '86
17	(15)	Karate Combat	Superior	£8.95	£11.95	Yes	Yes	£14.95	July '86
18	(–)	Impossible Mission	Epyx-US Gold	£8.99	—	Yes	Yes	—	—
19	(–)	Last Of The Free	Audiogenic	£7.95	—	*	No	—	February '87
20	(10)	Vegas Jackpot	Mastertronic	£1.99	—	Yes	Yes	—	—

Pursue the trivial up two places to number 3



Lieutenant John Stryker runs up to the top



In its third incarnation Repton keeps selling

TOP 10 ELECTRON GAMES

		Title	Publisher	Cassette	Disc	Reviewed
1	(–)	Computer Hits 10 Volume 3	Beau Jolly	£9.95	—	—
2	(–)	Repton 3	Superior	£9.95	—	January '86
3	(1)	Micropower Magic	Micropower	£7.95	—	—
4	(–)	Mousetrap	Tynesoft	£6.95	—	—
5	(5)	The Way Of The Exploding Fist	Melbourne House	£9.95	—	April '86
6	(–)	Ravenskull	Superior	£9.95	—	—
7	(–)	Crystal Castles	US Gold	£8.99	—	—
8	(–)	Five Star Games	Beau Jolly	£9.95	—	—
9	(10)	Strike Force Harrier	Mirrorsoft	£9.95	£12.95	January '86
10	(–)	Thai Boxing	Anco	£5.95	—	—

COMPILED BY GALLUP/MICROSCOPE

* PLEASE CHECK COMPATIBILITY

For the BBC MICRO ELECTRON

Ravenskull

The Eerie Loading Screen

The Elf escapes from a Ravenbee

Close-up of a Crystal Ball

The Adventurer collects a Treasure Chest

Ravenskull Castle — The Fortress of Doom

Your task is to save the village of Austburg from imminent devastation. You must enter Ravenskull Castle and retrieve the silver crucifix which the evil Baron Strieg has stolen. Only then will Austburg be safe from the Zombies who inhabit the swamp surrounding the medieval castle.

Ravenskull is a massive arcade-adventure featuring smooth 4-way screen scrolling over the 4 levels of play. Each level is 64 times the size of the screen, and there is an initially-bewildering variety of game characters including: acid pools, man-eating plants, time-doors, keys, pick-axes, scythes, spades, bows and arrows, dynamite, bells, food and wine (beware! it may be poisonous or have strange side-effects). There are also several magical scrolls and potions to be found. These may be good or evil; for example the strength scroll gives you the power to push wooden casks, whereas the lightning-strike scroll is fatal if used.

The guardians of the castle, the vicious Ravenbees have to be avoided or, in some cases, destroyed — but there is only one way to kill them; you must discover how as you venture through the dank passages of the castle. Your quest is not an easy one — only with time, experience and a little luck will you unravel all the mysteries within Ravenskull Castle.

PRIZE COMPETITION

If you are skilful enough to complete Ravenskull, you can enter our prize competition. The prizes include a £100 first-prize, with Superior Software T-shirts for runners-up.

PRICES

Electron cassette................£9.95
BBC Micro cassette.............£9.95
BBC Micro disc (5¼")...............£11.95

Ravenskull is compatible with the BBC B, B+, Master





The screen pictures above show the BBC Micro version of Ravenskull.





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REVIEWS

GAMES

POP THE QUESTION

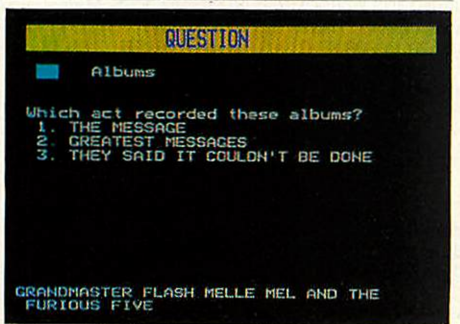


Chart Challenge; Outlook Enterprises; 80 track disc £17.95; 40 track disc; £17.95; tape £17.95

As the title implies, *Chart Challenge* tests your knowledge of well known, and not so well known, pop trivia.

It comes to the 80 track disc user as a set of three double sided discs, to the 40 track disc user as a set of no less than *five* double sided discs and is available on tape as a set of five cassettes.

After loading, a menu is displayed asking you to select one of six options (four for tape users):

1. *Trivia*. If you possess the classic board game this will keep you up all night. After loading the computer's internal database – which takes over four minutes for disc users! – you can select six categories which represent your slices of pie (just like the real question cards). It took me a while to understand what was going on, but I now realise that Trivia is just a replacement for the question boxes in the 'real thing'.

2. *Hangman*. What more can I say? This is just a version of the old pen and paper game. First you have to identify a single, then the artist, the highest place it reached in the charts, and finally the year in which it was a hit. Finding the year is rather a hit and miss affair – I just tried every year in the given period!

3. *The Quiz*. In this section, you, and a second player if you want, answer pop questions against the clock. You can ask for clues which often aren't much help anyway. You get 10 minutes to pile up the points. Five points are awarded for a correct answer, none for a wrong one. One feature that impressed me was the fact that you can spell words incorrectly or even miss words out of sentences and the computer still knows what you mean.

4. *Connections*. This section consists of seven rounds, in each of which you have to match up 10 singles to their respective artists, record labels, dates, and so on. It can become a bit of pot luck when you don't know any more connections!

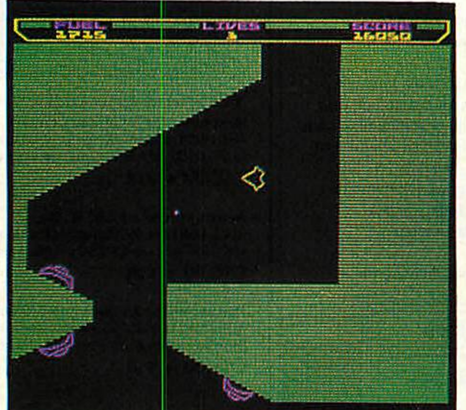
The other options on the menu are for disc users only, and cover the game's high score tables.

Overall the programs are very good indeed, with clear instructions, and are fun to play for pop fans. There is, however, one major criticism: the fact that the data takes such a long time to load. Disc is slow, so I hate to imagine how long it would take from tape.

One last thing. Why is it that the instructions have to be printed on such a small piece of paper?

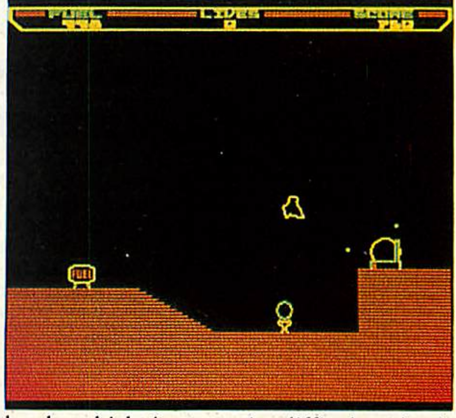
Richard Bellis

THE UTMOST GRAVITY



Thrust; Superior Software; Electron/ BBC B/B+/M; cassette £7.95; disc £11.95

This Acorn version of a Commodore 64 best seller is one of the best BBC micro or Electron games I've come across in a long time. Both Electron and BBC micro versions have all the features of an arcade classic – a simple plot and controls, super-smooth graphics, excellent feel, and lots of



levels which increase in difficulty slowly enough to keep you trying, yet fast enough to slow you down.

The plot is the same on each of the 24 levels – collect a pod from the respective planet. Each planet has an increasingly sophisticated defence system. Limpet guns are strategically placed to impede your progress and, though you have weapons, your targets are often initially out of sight.

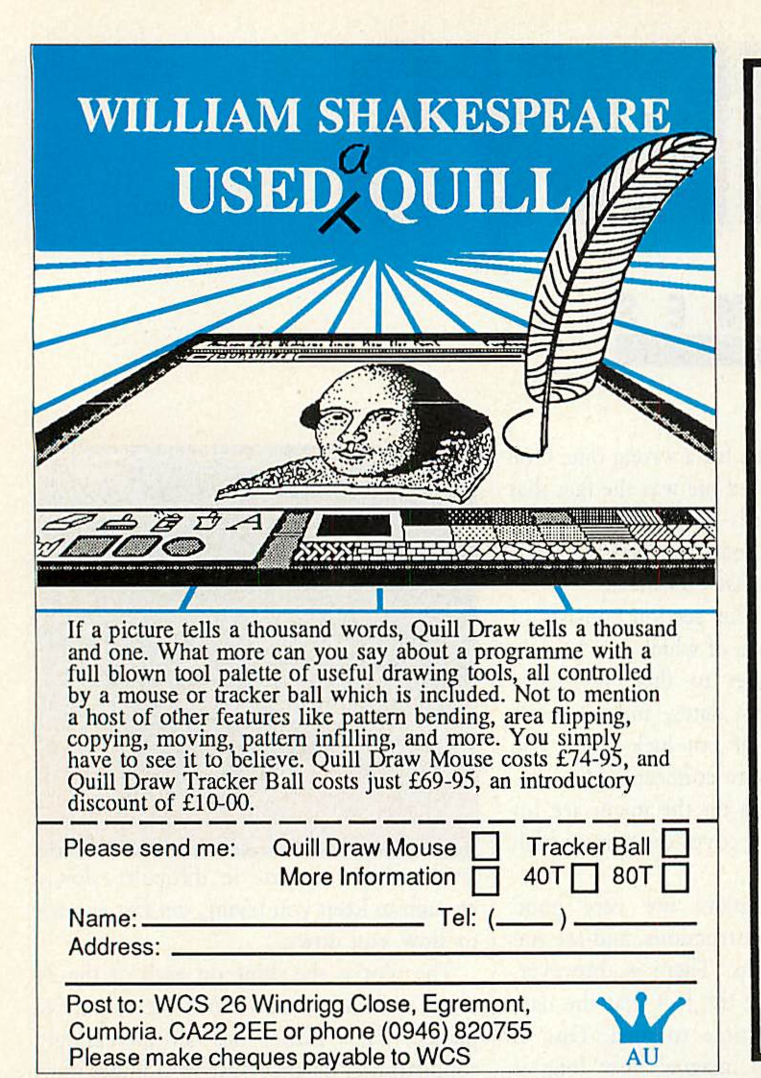
Nuclear reactors supply the defence systems with power. These can also be attacked, temporarily disabling the limpets. Unfortunately, pumping too many of your rockets into the reactors will cause the planet to explode, taking you with it unless you're a really fast mover.

As you progress through the levels, you'll find new problems to solve, like the dead end I've just come across, which turned out to be a door opened by firing at a nearby handle.

Your rocket is controlled by keys to spin you clockwise and anti-clockwise, and a thrust button which propels you in the direction you're facing. Meanwhile, the force of gravity is at work, with pulls varying with each planet, and sometimes having a negative value. In addition, invisible landscapes are promised, though I haven't seen any yet. (Well, you wouldn't, would you?)

Thrust is a very realistic and sophisticated lunar lander program, requiring the same sort of skills, as say, *Pole Position* – fast reactions, an ability to anticipate problems, intense concentration, and careful judgement. I'm hooked.

Bernard Emblem



DOUBLE PHANTOM?

YES! This IS the program demonstrated on BBC TV's "Micro Live". The Worlds first micro multi-user combat flight simulation is now available direct from DOCTOR SOFT via our 'HOT LINE' FIRST CLASS MAIL ORDER service.

DOUBLE PHANTOM is basically a TWO computer version of the highly acclaimed PHANTOM COMBAT simulation. At least one BBC must have a disc system. A hardware link (included) then links the machines which become separate aircraft sharing the same airspace, each VISIBLE and VULNERABLE to the other!

DOUBLE PHANTOM has all the usual PHANTOM features including the fastest and smoothest 3D colour graphics around (15fps). RAF Phantom pilot Paul Courtnage's verdict: "Marvellous . . . quite the best micro flight simulation I've ever seen . . . Totally captivating!"

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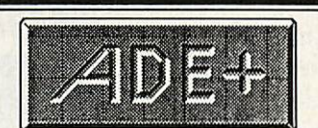
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- Assemble absolute or relocatable code
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- Macros nestable to any depth
- Excellent error diagnostics
- Linker
- Editor and symbolic disassembler provided



Versions and prices

Recommended for Master Compact...
ADE+ MMU and 65C00 series assembler on disc (3.5" ADFS). 32K sideways RAM required.
£42.00 + vat

Recommended for BBC B, B+ ...
ADE+ MMU and 65C00 series assembler on 2 16K EPROMS with DFS 5.25" utilities disc.
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Recommended for Master 128, turbo..
ADE+ MMU and 65C00 series assembler on EPROM cartridge with 5.25" DFS utility disc.
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The Ultimate Assembly Language Development Tool

ADE+ is a 65C00 series assembler system supporting all the mnemonics of the 65C12 used in the latest BBC microcomputers plus the additional 'Rockwell' instructions. ADE+ is fast, faster in fact than the in-built BASIC assembler and all rival products that we have tested. The assembler produces absolute code that can be *RUN or linker modules that can be merged with the output from other programs using the ADE+ linker. ADE+ supports a powerful linker which drastically cuts assembly time; a feature normally only found on minis and mainframes. The linker will even link the output from compilers with your assembly language programs. Full library support for both the linker and the assembler is provided – fast searching for unknown instructions in a random access macro library. ADE+ is a modular system with many modules to add later; i.e. a mouse based editor & a Z80 cross assembler! A print spooling system uses sideways RAM as a print buffer to eliminate waiting time; your listing runs off as a background job! Use the print spooler from BASIC or your own programs. ADE+ uses ALL available memory. With a second processor attached the 10 processor spare memory is used as a buffer to reduce the amount of disc access. All available memory is handled by ADE+'s intelligent memory management module. Use your own favourite editor or the one provided. Assemble from disc or memory. Full utilities including librarians, converter for BBC BASIC etc. ADE+ must be the bargain of 1986/87!

A comparison of three 65C12 assemblers

Feature	ADE +	BBC Basic	MACROM
Number of pseudo-ops	64	4	36
Use of all available RAM	Yes	No	No
Macros	Yes	No	Yes
String functions	Yes	Yes	No
True macro libraries	Yes	No	No
Relocatable output	Yes	No	No
Linker with libraries	Yes	No	No
High level constructs	Yes	Yes	No
Use any editor?	Yes	No	No
Number of error reports	39+warnings	3+BASIC errs	20
65C00 extended opcodes	All	65C12 only	65C12 only
Switch off 65C12 opcodes	Yes	No	No
ROM size	32K	16K	16K
Disassembler	Symbolic	No	Simple
Label restrictions	No	Yes	Yes

GAMES

THE GAMES PAGE

David Lawrence describes the latest on the horizon, and some high scores from readers

After last month's avalanche of releases, hardly anything new seems to have appeared on the games scene.

However, good old Superior have come up with yet another large arcade style adventure game called *Ravenskull*, Tynesoft have released all their games on disc and US Gold seem to be active again. Martech (who are they?) have produced *Sam Fox Strip Poker* which Bruce can't wait to get his hands on. Off the arcade front, CDS systems are now marketing the follow-up to the highly successful *White Knight* chess games (11 and 12). Martin Bryant has again souped up his algorithm to produce *Colluses 4.0.* I have not yet seen the system in action, but would imagine it plays pretty mean chess!

Ravenskull contains features from both *Citadel* and *Repton* – should it be called *Citroen*? There are four levels, each of which is 64 times bigger than the screen – you scroll around as in *Repton*, but you must work out how to open doors, use spells and collect treasure like *Citadel.* Watch out for a full review next month.

Tynesoft are getting a reputation for good quality software with excellent graphics and addictive games, but when I received the disc copies, my opinion of them dropped a few notches – flimsy cardboard packaging, no disc covers, instructions on cassette inlay cards and loading instructions like: 'CHAIN "MOUSE" to load'.

Impossible Mission is the latest release from US Gold, and is yet another conversion from their very popular Commodore 64 range of software. The game contains some very nice animation, especially the way you jump, and seems to contain most of the original Commodore features. I don't think the digitised speech is in it, but I have only glimpsed at the BBC micro version. Other titles that may or may not appear soon include *Sword of the Samurai*, *Masters of the Universe*, *Saigon*, *Temple of Terror* and *Kayleth*.

Hot on the tail of Domark's *Trivial Pursuit* comes their first tape of extra questions. *Genus II* (*Genus* is supplied with the game) should be coming soon. What would be nice, of course, would be a question editor or such like.

Andrew Cook has been busy and has sent in a few very interesting pokes, most of these are being tested at the moment and should appear soon – how do infinite lives, protection from spirits, boulders, monsters, skulls and meteors sound in *Repton 2*? Watch this space! Talking of *Repton 2*, the maps should also start appearing soon, along with annotation from Superior Software. Andrew has also sent in some adventure hints, but rather than simply list them all here, if anybody has any specific problems with any adventure, please send details to The Games Page.

The high score table is back after a short break and the current round-up is shown above. The table will be compiled and printed every other month. Any high score claim must be witnessed by two other people, one of whom should be over 18 and preferably a parent. A photograph of the game's high score table would be nice, but is not absolutely vital. The game must be played in its unadulterated form – ie, no cheating! When sending in your score, please state the machine (BBC micro, Electron or Master) and ask the witnesses to sign the letter as well. Anyway, enough of the rules, I would be interested to receive high scores or low lap times on *Revs*, fastest time to beat, or slowest computer think time on *White Knight* chess and highest level on *The Sentinel.*

Acorn User Highscore table as at 18/11/86

GAME	SCORE	NAME
Alien 8	28 lost	Francis Brown
Android Attack	149,105	Tim Hedger
Arcadians	98,020	Niaz Islam
Aviator	30,450	P Hopgood
Battletank	117,400	Stephen Gayler
Beach Head	166,000	Nicholas Brown
Castle Quest	3,020	Francis Brown
Chukkie Egg	32,002,640	Nicholas Wright
Cybertron	715,960	Niaz Islam
Exploding Fist (BBC)	397,100	C Parsons
Exploding Fist (Electron)	597,000	Hugo Moore
Fortress	138,720	Stephen Gayler
Frak!	20,000,200	Paul O'Malley
Free Fall	5,024	Philip Comber
Hopper	63,104	Nicholas Brown
JCB Digger	131,450	Stephen Concoran
Killer Gorilla	836,475	Stephen Concoran
Match Day	14–0	Peter Harvey
Meteors	498,500	P Ludgate
Missile	469,225	Ian Boffin
Monsters	283,000	Stephen Concoran
Moonraider	642,125	Stephen Concoran
Mr Ee!	1,102,300	Julian Jones
Overdrive (BBC)	380,640	Stephen Gayler
Overdrive (Electron)	1,130,700	Simon James
Painter	203,690	Nigel Shaw
Pengo	312,900	Sarah Killworth
Planetoid	3,186,450	Stephen Concoran
Pole Position	384,250	Niaz Islam
Rocket Raid	168,010	Stephen Gayler
Snake	1,395	Peter Simpson
Snapper	1,839,210	Peter Simpson
Space Adventure	4,890	Mark Bradshaw
Starship Command	8,420	Ian Boffin
Thrust	205,300	Thomas Simpson
Zalaga	29,329,420	Stephen Gayler

SOFTWARE

STRONG BASE

Dataprobe is a sophisticated educational database for fostering understanding of data manipulation. Nick Evans gets to grips with it

Dataprobe is a random-access database package. It has comprehensive support materials in the form of extensive data files and pupils' books and worksheets. Not only is the user able to employ the package in all the normal database applications that have been exemplified in a variety of other packages, he or she is also given impressive graphic display facilities including pie charts, histograms, scattergrams, Venn diagrams, mapping and graphs.

Dataprobe is definitely not a package which a teacher would use to introduce the concepts of databases. It is complex and enquiries are still a long way from natural language in their structure. The use of =, ‹ and › to relate elements in an enquiry seems to be taking a liberty with principles of language use held dear by primary teachers. There would be little problem in entering 'greater than' or 'equals' as single key strokes from the function keys.

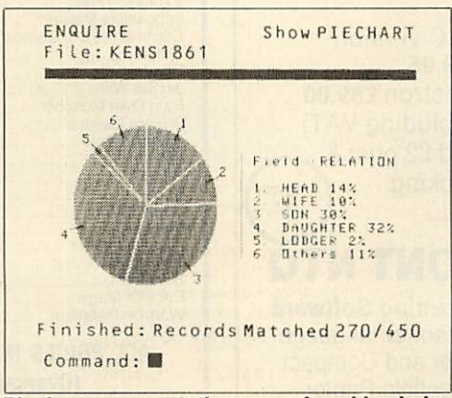
With that qualification, the rest of the enquiry format is reasonably logical although some will see it as limited in some aspects. A typical enquiry looks like this:

ENQUIRE, NAME CONTAINS "BRUCE" AND HAIR=RECEDING AND NOT(AGE ‹40 AND IQ›100)

As with all things, familiarity with the system does make it easier to use but a menu-driven or simple command-driven start to database handling is easier for younger children. As they get more experienced then the more complex varieties of search become available.

Dataprobe is rather slow when it searches the database and with the extensive records provided on the example files the child has to wait a considerable time for an answer to his enquiry. This of course varies with the disc filing system and drive.

Two further small grouses before I turn to the good points of the package. The first is that if the user is creating very large files, ie, above half the capacity of a disc surface, then it becomes impossible to edit the individual records since *Dataprobe* stores the entire file with the amendments recorded, in addition to the original. The way round this as described in the handbook would frighten the pants off many fairly inexperienced users.



Piechart representation: one of a wide choice

The other problem concerns the price of £49.95 per pack. Although beautifully presented, I doubt whether many schools are going to be able to afford fifty pounds for the starter pack and a further fifty for the additional data files. Secondary schools may be more able to afford this package, but with the obvious practical limitations on file length it seems unlikely that it would be used for the multitude of purposes for which schools need a database.

Having said all that, the package offers a good medium for 'intermediate' data handling in that its facilities – notably its graphics – are excellent. Dealing with this aspect first, access to the graphic facilities is obtained simply by a command such as:

SHOW PIECHART, ‹fieldname›, ‹no. of sectors›, ‹field value 1›, ‹field value 2›,

An example from the book is:

SHOW PIECHART, RELATION,5, HEAD,WIFE,SON,DAUGHTER, LODGER

With the Histogram facility, two charts may be plotted side by side, giving a useful ability to compare data.

One of the impressive elements is the ability to plot information onto a map. This has never been an easy task at the best of times. The AUCBE *Qmap* package made a good attempt at this and, on balance, is probably better than this one. However, *Qmap* is a separate package and the mapping facility for *Dataprobe* comes as part of the pack. The data that is created for the file must contain spatial location co-ordinates which relate to the map on screen. This map must then be carefully created to ensure accuracy with the information being plotted, which is difficult. My attempt was so disastrous that I will not show it, but I did not follow the suggestion of tracing the map from an acetate taped on the screen. An improvement would have been to allow alternative input devices, even just joysticks.

A useful additional facility is the ability to call up statistical analysis after an enquiry simply by commanding:

SHOW STATS, ‹fieldname›

This will give maximum and minimum values, total and average.

Supplied with the package comes the 'Town and Country 1861' data file which provides an insight into life in North Kensington and the village of Wortham in Suffolk. Excellent support materials are provided with this pack. In addition to the data disc comes the handbook which provides background reading, not just relating to the areas covered but also to census work in general, work sheets, maps, assignments and hints on creating your own data files. This comprehensive set of resources has obviously been created over some time. Similar quantities of materials are provided in the add-on pack which contains files on birds, litter louts and weather.

The great strength of this pack is the quantity of material it provides, ready-prepared, for the teacher. Its weaknesses are its price and to a lesser extent its comparative sophistication for beginners. Having said that, it represents the coming together of a huge amount of work which has been presented in an exceptionally attractive way. For schools which are wanting to take an intermediate step in database use with graphics this package would be on the right road.

Dataprobe is published by Addison-Wesley, Finchampstead Road, Wokingham RG11 2NZ. It is compatible with the BBC models B and B+, and Master 128, but not Econet, and costs £49.95 (plus VAT on the software section of the package).

GAMES

FREE AT LAST



The Last of The Free; Audiogenic; Electron/BBC B/Master cassette; £7.95

In his dying breath the elder-oid whispers, 'Clement, earth must be warned.'

Originally planets distant from earth were patrolled and maintained by the Ordanoids. To help with this task the Proleoids (are they good at taking pictures?) were produced and placed on these planets. Things started to go wrong, however. A fault developed in the Proleoids which caused them to dominate and ultimately destroy the Ordanoids. All but one that is. And of course it's you, Clement, that's the last of the Ordanoids, The Last of The Free! It is up to you to warn Earth about the fault. To do this you must first escape from your home planet, and the problems this creates are the basis of the game.

There is a number of rooms through which Clement must be guided. Within the rooms you will find objects which can be used to solve puzzles (eg, keys for doors).

On most screens you will encounter various types of flying objects. These include dustbin lids, fish bones and bumble bees. You must also watch out for nasty creatures which scurry along the ground, inescapable pits of oil and fake floors, all of which reduce your energy. Clement starts off with five lives and loses one every time his energy reaches zero.

At present, the number of games for the BBC micro which could be classified as arcade adventures is very small. Many are direct transfers from Spectrum games, and thus do not do the BBC micro's graphics credit. This game, however, is different.

The use of the mode 5 screen and the fact that most of the characters in the game are of a fair size (approximately 16×16 pixels) make the game pleasing to play and watch. Coupled with the smooth character movement, the result is one of the best of the genre.

The Last of The Free also has music, but after a short while you come to the conclusion that its best feature is the fact that you can switch it off! The sound effects are not as bad, but nothing to brag about.

Overall, the game is worth buying, the good graphics outweighing its poor sound.

Gavin Gillings

FIGHT FOR YOUR KNIGHTS



Joust; Aardvark; Cassette; £9

Aardvark's latest is a version of the arcade game of the same name. Unfortunately it doesn't come up to the standard of the original but it is still very playable.

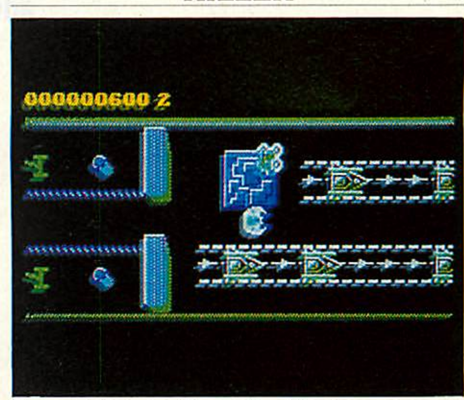
In one player mode you take on all the enemy knights alone whilst in two player mode the idea is the same but with both of the players fighting the knights. The two player mode has gladiator waves in which the players have to try to kill each other to obtain bonus points.

At the start of each wave you and the knights materialise from one of the six energiser pads on various levels. Points are scored by killing the enemy knights and also collecting the eggs which fall from the knights' ostriches when the knights are killed. If the eggs are left too long they will hatch into another knight.

Action is a bit lacking but the graphics for the characters although small move fairly smoothly. Sound is very disappointing; there are only a few sounds for various happenings in the game. All in all I was disappointed as Aadvark's previous games have in my view been superb.

Chris Hunt

PSYCHO KILLER



Psycastria; Audiogenic; Electron (cassette only)/BBC B/B+/Master; cassette £7.95, disc £11.95

'You have been psycastrated (ouch!) into the body of ace flyer Commander Ronald Bogglewick and must attack the Psycastrian installations on land and sea, on the moon and in deep space.'

The game begins on land, where you must fly over the installation and destroy 10 energy pods (*Zaxxon* style). This sounds quite simple on paper, but the pods are virtually inaccessible and you are also under constant attack from Psycastrian ships that patrol the installation. Once you have destroyed all 10 pods, you must land on the main runway.

The game makes use of some of the best mode 1 graphics I've ever seen. Mixed colours are used to show shadow and texture on the ground (this is most effective on a monochrome TV/monitor, especially on the later levels). Fast, flicker-free scrolling is used throughout, giving a good sense of movement.

Unfortunately there is a price to pay for all this. The above seems unbelievable until you see the size of the screen. It measures about 4in deep by 7in wide (on a 14in TV), which must be a record for the smallest screen ever seen!

Although you have good control over your ship's movement, it's all too easy to crash into obstacles such as buildings, but as always patience and practice should pay off in the end!

At £7.95, *Psycastria* is very good value for money. If you enjoy a challenging shoot-'em-up, this game should prove a worthwhile addition to your collection

Robert Miller

SOFTWARE/BOOK

FAMILY BUSINESS

The *Family History* system helps genealogists. To advise programmers, there's a new book

Family History system

Genealogy may not be everybody's subject but it is something that everybody has, like it or not. Most people, at some time, have some curiosity about it.

Due to the compulsory registration of births, marriages and deaths since 1837 it is not too difficult to trace your lineage back to about 1800. It may, however, take a lot of time and be quite expensive. The cheapest and easiest start is to buttonhole the oldest member of the family and to cross-examine them until their eyes glaze over. Obviously, the sooner this is done the better: they may not be available for questioning next year!

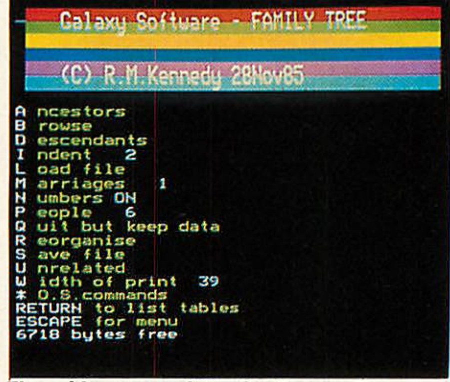
Now grandfather, for instance, will supply you with names, dates, anecdotes and garbage. This is where your computer can begin to help you, for, like programming, genealogy consists of the organisation of data. In fact, any card index type of filing system will do the job but within the pages of *Acorn User* two companies have advertised programs specifically for genealogists. These are Bel Tech of Shropshire and Micro-Aid of Cornwall.

The Bel Tech program is in the course of being re-written, but the *Family History* system from Micro Aid is very simple to use and provides an excellent, uncomplicated start for the budding genealogist.

The program comes with an indexed, ring bound manual, which is mostly written in straightfoward English. Those who find any manual virtually unintelligible at the first reading should turn straight to page 27 and read how to play about with the two demonstration programs that are included with the suite. The examples relate to the Royal Family and a family called Smith from Orkney. Having seen the workings of an existing database, compiling your own becomes quite painless.

The principal program of the *Family History* system is ETREE (for Easy Tree). I entered 265 people and 63 marriages, representing five generations from a couple who married in 1732, before running out of room. If the notes on each person are kept short – or entered in a form of shorthand – the program can accommodate 320 people and 100 marriages, which is plenty for a specific area of research, and more extensive records may be split. Genealogical multiplication of individuals is quite breath-taking: it was estimated in 1907, for example, that there were about 100,000 known decendants of Edward III (King of England for 50 years from 1327). These numbers exceed anything the BBC micro can cope with all at once but the usual nature of research covers quite small segments of a family tree at any one time.

Once the data is entered, there is a facility for browsing through the records without having to know in advance where you are going. From any individual it is possible to pass, with a single keystroke, to their parents, their children or 'sideways' to their spouse, brothers and sisters. There is also a search routine which seemed to work smoothly and quickly in finding individuals from mere fragments of their name. It even works in the 'details' section which may contain occupations, places or, if you want, colour of hair.



The wide range of Family Tree options

Both browsing and searching are vital to the practical aspects of research. Suppose that you have ordered a Birth Certificate for John X, believing him to have been the son of Joseph and Mary X. When the Certificate arrives you find that the father's name is given as Joseph but the mother was, say, Sarah. There is clearly a number of possibilities, but if the father's occupation and general area of residence fit in with the original Joseph, you probably have to consider a second marriage. Thus a search along the issue of Joseph and Mary that you know about will produce 'limiting' dates for another spouse. Checking the marriage again may reveal that Joseph was a widower when he married Mary. Or, perhaps, you have to find another Joseph but the information that you have may be entered into the database as an 'unrelated' indivdual while you explore all the usual avenues and cul-de-sacs. The computer can be made to disgorge its information in an impressively simple way.

In addition to the 'on screen' searching, the information may be printed in a number of ways. Either descendants or ancestors of an individual may be listed on a progressively indented format. As your research expands and the more remote members of your family learn what you are doing, letters begin to arrive from distant cousins in New Zealand asking for details of their ancestors. A full scale family tree can cost an arm and a leg to send to the Antipodes (cousins *never* offer to defray the expenses) and a simple 'father to son' lineage can solve the problem very neatly. If you feel more generous, the program will print a family tree in a more or less traditional format. Using condensed print (15 characters to the inch) the seven generations in the Royal Family from Queen Victoria to the present time fit comfortably onto a piece of A4 paper.

The format is vertical with the oldest generation on the right. Ideally, printing might be sideways, along the length of continuous stationery, although such an arrangement would exclude daisy wheel printers. Of course, the most handsome pedigrees are drawn by hand (or you may not have a printer) and here the program confers an accidental benefit. The biggest single problem with drawing a large pedigree is calculating the spacing for each line. Time and again I have calculated so many millimetres for each name only to find that a whole family has been missed out. As the program makes its own calculations, the layout is displayed on the screen with an arrow representing each individual so,

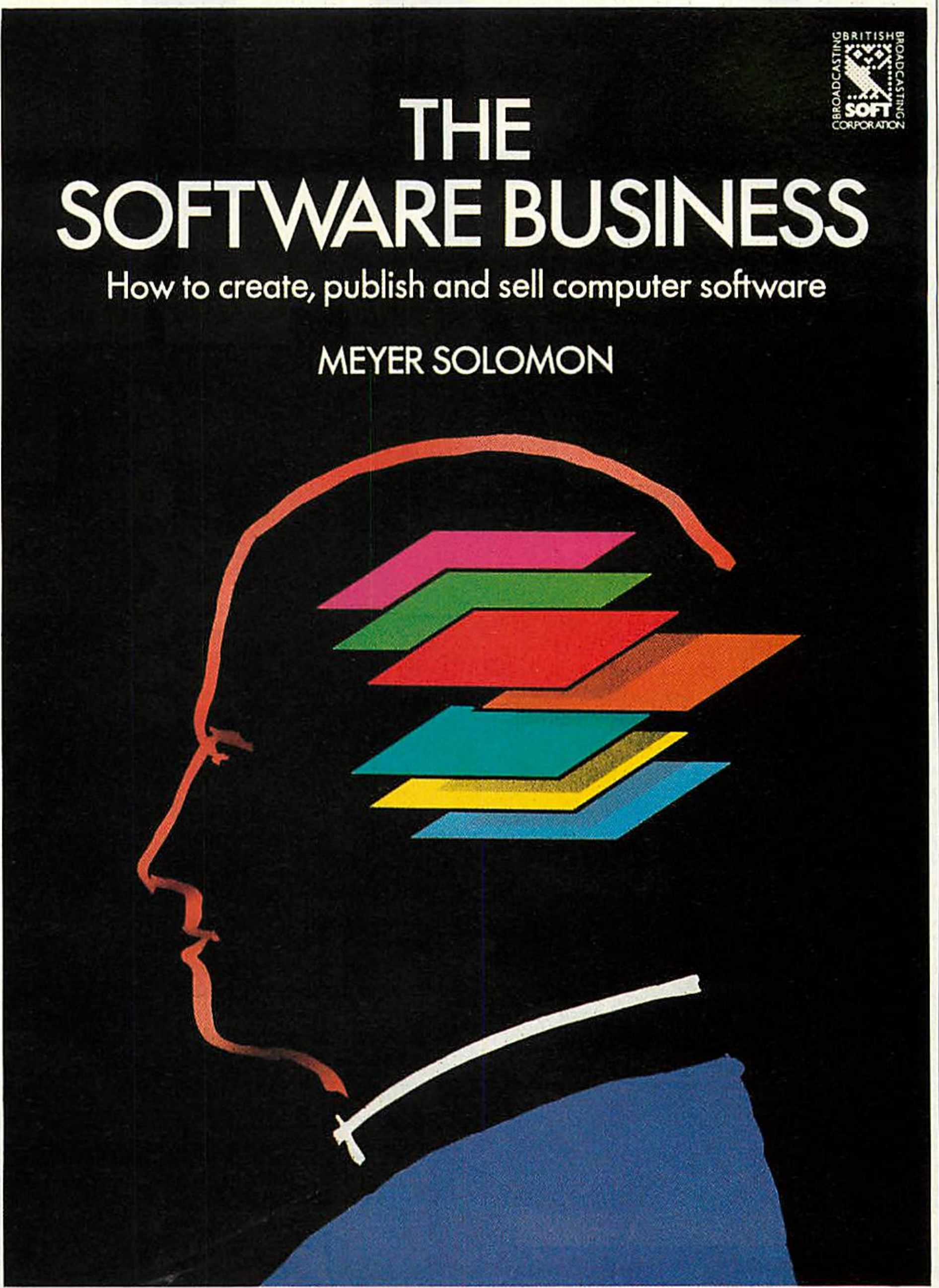
counting the arrows produces the number of individuals per generation line.

To many people, recording their personal lineage may seem to be a rather trivial exercise. I happen to look on it as a 'real life' adventure game and the cost of the *Family History* system, £19.95, is little more than many other disc-based games. Otherwise, if you have a taste for those Russian novels in which the principal characters change their name in every chapter, a genealogical print-out of all aliases could be instructive. Similarly, many readings in history are simplified by a knowledge of the family links. Consider, for example, the Wars of the Roses. Read straight from the textbook, the sequence of events seems bizarre, but reduce it to a power struggle between cousins and light is thrown on the darkest deeds.

Finally, when you tire of your research or have gone as far as you can, spare a thought for other people who may be trying to follow the same track. The Genealogical Society in London is interested in the results of anyone's labour and is a worthwhile repository for all your accumulated paperwork. **Michael Leete**

The Family History system runs on models B, B+ and Master. The B+128 and Master versions have greater capacity. All are on the same disc, which costs £19.95, plus 55p post and packing from Micro-Aid, 25 Fore Street, Cambourne, Cornwall TR14 0TX.

The Software Business



Meyer Solomon's book, published by the BBC, tries to give a foothold for the novice

Meyer Solomon was the founding editor of *Personal Computer World* and a few other computer magazines. In the late seventies he was one of various people who saw that not only were home computers likely to become as common as video recorders (if not washing machines), but also that the software industry was about to take off.

His book is a many-headed creature, more for the browser perhaps than anyone seeking deep knowledge. First the good points; it's well-written, printed and produced (a rare thing in computer books these days) and good value for money at £5.50 for 144 pages. It touches on a wide range of subjects such as how to define the market, how to approach it (sell it yourself or go to a publisher?), the importance of good documentation (programmers will have to learn how to spell properly and change their printer ribbons occasionally), the well known fact that all program writers are optimists and it takes four times as long to write a program as the original estimate, and even how to set about choosing snappy titles and slick packaging.

Against that, it has to be said that he tries to go in too many directions at once, and space reasons seem to have prevented him from tackling any subject at depth. For example, he talks about royalities, and even includes as an appendix an entire BBC Publications contract as a model. Nowhere does he explain that most software houses, unlike the BBC, pay royalties on the net proceeds received from the retailers and distributors – a crucial distinction from which many a teenage programmer has unwittingly suffered.

Mr Solomon's wide-ranging selection of subjects once or twice falls flat on its face. For example, he recommends various books such as Fowler in a somewhat solemn fashion, exhorting documentation writers to do a decent job of plain English, and yet manages to give one of his chapters the ghastly title 'Reify the Idea'!

This book may provoke some thoughts, but it isn't a manual of how to make money for anyone. Even so, *The Software Business* is probably the easiest place to find a reasonably comprehensive checklist of most of the things needed to publish a piece of software.

All in all one wishes it was twice its current length and less superficial.

Simon Dally

'The Software Business: How to create, publish and sell computer software' by Meyer Solomon, BBC Publications, £5.50.

INTER WORD

The integrated word processor for the BBC micro

INTER-WORD is fast, efficient and simple to use. Being menu operated the newcomer does not need to remember strange key combinations or command names. The menus are not a burden to the experienced user since there are shortcuts to access many of the features.

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• Multiple documents in memory
Most people do not work on one document at a time. INTER-WORD allows up to 16 documents to be stored in memory at once, and text to be transferred from one to another.

• Multi column
Built in facilities for printing text in up to 5 columns.

• Pull down menu operation
Simple and fast selection of all INTER-WORD options and page layout.

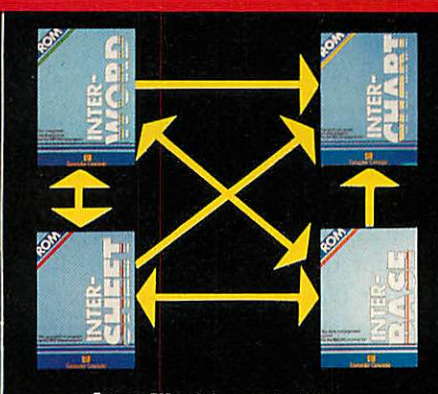
• Multi-file operation
Very large documents can be handled with ease. INTER-WORD's unique multi-file mode puts virtually no limits on document size and allows simple and fast movement to any point in the document.

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Review

"INTER-WORD is the most powerful and comprehensive word processor available for the BBC today. It is more powerful and flexible than View and still retains much of the friendliness and ease of use of Wordwise. Inter-Word looks set to become the standard word processor for the BBC Micro."
Beebug, Aug/Sept '86



Inter-Word is part of the 'ROM Link' series which is the only truly integrated suite of ROMs for the BBC micro.

£49.00+vat (£56.35)

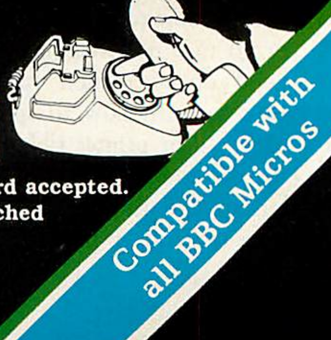
• Block operations
These are common to most word processors, but with INTER-WORD any part of the text can be marked and then instantly moved, copied, deleted, printed, saved, underlined etc. There is no limit to the amount that can be marked.

• Automatic re-formatting
This enables the user to just type—no keys to press to re-format the paragraph after changes to the text or margins have been made; the margins on the rulers can simply be dragged, all text being instantly re-formatted to the new settings.

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- **Mail merge**
- **Integrates with all other parts of INTER family**
- **Automatic page numbering, with headers and footers**
- **Very fast and smooth scrolling**
- **Powerful search and replace facilities including wildcards, upper/lower case sensitivity, stored search and replace strings for instant re-use**
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- **Selectable screen colours**
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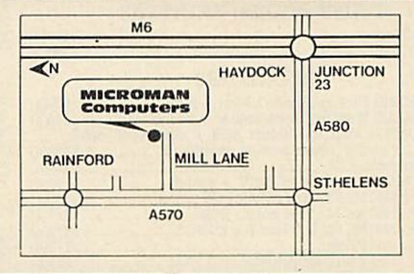
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SOFTWARE

ARTICULATION

Jonathan Baldwin delves into *Artroom*, Clares' graphics package, assessing the Nidd Valley mouse along the way

The recent launch of the Master Compact has put Acorn squarely back in the home micro sector of the market, thus broadening the already wide appeal of the Master series. To date there have been several claims of compatibility from various software houses but *Artroom*, a graphics utility from Clares, must be one of the first items to be produced specifically for the Compact. It will, of course, run on any Master series computer.

The package consists of a manual together with two programs and some utilities supplied on a disc. A second screen gives access to a choice between *Artroom* itself or a printer driver, and choosing *Artroom* loads its image into the resident sideways RAM.

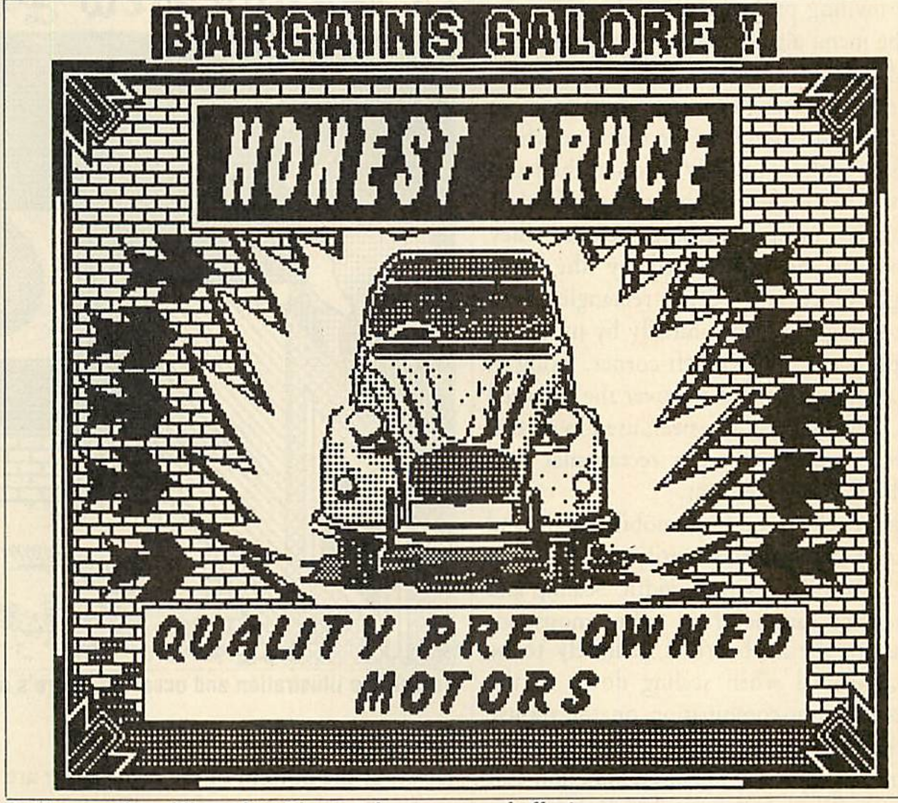
On the menu

The main menu is the first thing to appear and it returns at any stage during the program when you complete, or otherwise leave, one of the drawing functions. It consists of a block of 40 icons arranged to look, for all the world, like a bar of chocolate; each icon can be highlighted in turn, either by using the cursor keys or by moving a mouse. The M and K keys allow either to be chosen throughout the course of the program; this is a useful option to have available since a mouse cannot offer the positional accuracy of the keyboard, and the keyboard lacks the ease of movement provided by the mouse.

Guided tour

Clares provide a 'Guided Tour' as part of the manual and this is certainly one tour which is well worth taking. It begins with a drawing of a Metro car from the graphics library provided on the program disc; you are then given a step by step recipe for its completion – a sort of computer 'painting-by-numbers'. The remainder of the manual contains a more detailed description of each function, followed by a description of the 'Printer' program and a couple of pages of 'Hints and Tips'.

In their introduction, Clares emphasise that *Artroom* has been designed to produce screen images which are particularly suitable for printers. Indeed, due to the way the pictures are stored, this is the only way that they can be used with any ease. The program runs in mode 4 using white on black in order to provide a kind of graphic WYSIWYG (what you see is what you get). The general style of presentation and the design of the icons suggest very strongly that *Artroom* is the work of the same team that produced Mirrorsoft's £39.95 *Fleet Street Editor* (and indeed they're the same authors). This similarity only extends to the means however; the end objectives are rather different.



Outlines, colour fills and text boxes give a range of effects

Drawing and painting

The drawing routines in *Artroom* operate on the screen alone, corrections being made by drawing over the offending area, and as such it reminded me of *AMX Art* in use. The menu offeres a selection of five types of pen and an airbrush, and mouse-control is essential for anything other than straight horizontal or vertical lines. Even with a mouse this type of 'freehand-drawing' facility requires a certain amount of nerve and skill; with practice, though, it presents the least obstacle to genuine artistic flair and creativity.

Should you feel less self assured or require more exact control there is also a rubber-band drawing option. This allows the current line to be moved about the screen before it is actually committed to the design. It was when using the rubber-band that I came across the first one or two niggles of several which surfaced while I was running this program. Returning to the menu after banding would leave the last line drawn in inverted colours instead of 'dropping' it; I have to admit that I was caught out on several occasions by this little quirk. A rather more serious problem was caused by the initial line having its origin on the lower-right of the cursor. After a while I really began to wonder if my mouse was at fault but a quick

keyboard check revealed the same problem. This sort of criticism may seem trivial, but in constant use these faults are the kind of thing which make pencil-and-paper a very inviting proposition.

The menu also offers five shape-drawing icons, four for various rectangles and a circle. The rectangles are grouped together on the top row and can be black or white, solid or outline. Initially, I found the icons for the black outline and the solid white rectangles most confusing because they happen to be represented by the same design! Once selected the rectangles were easy enough to place, initially by moving a sample box to the top left corner, fixing it, and then stretching it to cover the required area. This idea has also been used in several other functions where a rectangular area needs to be marked out.

The circle is quite a mobile affair and manages to remain so until it is scaled up to a third of the screen width. Scaling and movement can be from either mouse or keys, but the keyboard is definitely to be recommended when scaling down as the chosen button-combination on the mouse will lead to spurious circles for the unwary. From the keyboard the circle function still has a few bugs. It 'wraps-round' the screen from top to bottom, which is not always very useful, and attempts to do the same horizontally and reappears in all sorts of odd and unexpected places. The problem has been solved, after a fashion, with the mouse by preventing the circle from leaving the side of the screen.

Above and to the left of the circle icon on the menu-block there are nine fill patterns and any of these can be chosen to fill an irregular shape. Filling can be a problem because the usual method is to cover the background colour up to the nearest foreground colour, so any break will allow the fill to 'leak out' with disasterous consequences.

But all is not lost, *Artroom* maintains a 'backup screen' for just such emergencies and an excellent idea it is too! This screen is updated automatically before a fill is initiated and the offending blob can be made to vanish instantaneously by selecting the relevant icon, returning to backup. It is also possible to update the screen at any other time should you choose to do so.



To suit the illustration and occasion, there's a choice of text fonts

Into print

Down at the bottom of the menu there are six fonts of display typefaces. When one of them is selected its file is loaded in and a rubber-band rectangle is placed on your artwork. The method used for drawing rectangles, described above, reserves space for the text, then it is just a matter of typing it in. This does need a bit of care, however, as it is all too easy to mistype a letter and in this case the Delete key will not correct the mistake.

I am not sure that a predefined space for the text is either helpful or necessary. Since the letters are proportionally spaced it is difficult to predict the length of words, and they are duly sliced up if they exceed their allotted span. As a result I habitually selected a vastly oversized text area and found the results most gratifying. The six available typefaces will suit a wide range of designs and Clares will supply a font editor or *Fontwise Plus*, at a price, should you need more.

Making changes

The remaining icons can be categorised broadly as 'editing' functions. There are two for copying designs from one area of the screen to another, one to enlarge, the other to reduce. The scaling here is two-fold, either vertically, horizontally or both, and as an option the copies can also be mirrored, again either vertically, horizontally or both. It is not possible to rotate designs as far as I can tell, despite the claims of some adverts.

There is also a colour-inverter which operates in a predefined box and is thus most useful with text or display boxes.

Inevitably some tidying up will be necessary and *Artroom* supports a first rate pixel editor for this purpose. Once the area to be edited has been chosen it is enlarged to cover almost the entire screen. This is done by using the reserve screen and the relevant area of the design is shown actual-size above it. Changes are made by placing the cursor over a pixel (shown as a small solid or outline box) and clicking the execute button on the mouse. The system remembers which change was made so that it is possible with a bit of practice to change whole lines of pixels in one go. Unfortunately this editor is rather too clumsy for use with the keyboard because the cursor

moves much too fast to be placed very accurately at the chosen point.

Moving to another part of the main screen is very simple either from the keyboard or with the mouse. The whole of the enlarged screen and the small one scroll in tandem with admirable smoothness. This makes it easy to search for hidden horrors such as broken lines which would cause leaks when filling. The business of loading and saving files is also straightforward and it is possible to select small areas of the screen for saving. This is particularly useful for creating composites from sets of previously saved picture elements.

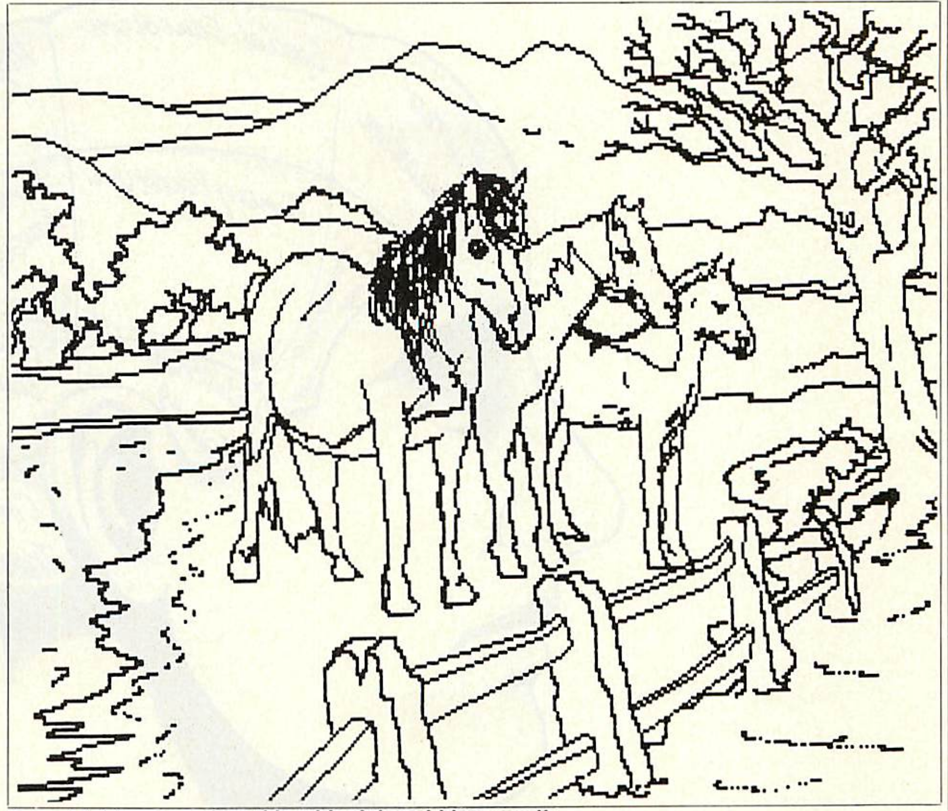
The printer

Once you have succeeded in creating your masterpiece it is time to think about printing it out as hard copy. It really is essential to have access to a good printer to get the best out of the *Artroom* package since the picture files cannot be used in other graphics programs.

It is necessary to CTRL-Break and start again to select the printer driver. This is set for Epson compatible printers but a utility has been provided on the disc to reconfigure it for other printers if required. When run the driver draws out a set of icons which are dominated by a large one representing a sheet of printing paper. All the choices are made from these icons, starting with the file loading option, moving on to image size (a choice of two), then finally its position on the paper. The dump itself gives absolutely superb results and is well worth a quick dash down to the nearest ribbon suppliers to see it at its best!

Remarkably it is no sluggard either, being roughly as fast as a printer in near letter quality mode.

The option of placing the design anywhere on the paper is provided to allow one to build up a spread of several images, possibly with some wordprocessed text as well. The positioning of the pictures also takes into account the fact that they can be less than full-screen, making it very easy to see how they will tie in with other images. With a little planning, perhaps using a layout chart similar to that favoured by newspapers, it would be possible to produce printouts for use as menus, publicity handouts, document covers and so forth.



Cut out 'n' keep – colour this with pink and blue pencils

The verdict

Artroom can be bought as an all-in package with Nidd Valley's Digimouse giving you a small saving on the mouse. I recommend this mouse without reservation; it gives as accurate a response as anyone will ever need when using a BBC micro, but above all it sits snugly under the hand and feels like a quality product.

Is *Artroom* itself a good buy? Compared to similar products which offer a combination of high quality text and graphics it is certainly competitively priced and well presented. In particular the menu offers an easy choice of functions and these have been sensibly implemented so that they are intelligible to novices and experienced users alike. As the first package of its type for the Compact, *Artroom* should benefit from having the market to itself, for a little while at any rate.

However the rush to get it published seems to have led to some missed opportunities which I am sure others will be quick to exploit. For example the Compact has a lot of spare memory, especially when run in mode 4 from sideways RAM. This could have been used as a workspace for editing, correcting and positioning design elements from a library.

The graphics library contained on the disc is also a little disappointing because it concentrates on digitised pictures. I would imagine that a wider selection of decorative motifs, symbols and borders would be of more use to people. Some routines should also be improved; copies, for example, obliterate everything in their path yet in nine times out of 10 one would prefer the foreground only to be copied.

Artroom is a good quality graphic utility to drive your printer for the Compact or Master. However, I don't think the package makes the most of the machines – it'll be interesting to see what companies like Clares will do next. But this package, right now, at this price is the best there is.

Artroom is compatible only with the Master series. 5.25in disc costs £25 and 3.5in for the Compact is £27. A sample disc costs £2 in either format. An extension disc, with mode conversion, extended colour fill designer and mode transfer to load any screen into Artroom, will be out soon. Clares Micro Supplies, 98 Middlewich Road, Northwich, Cheshire CW9 7DA.

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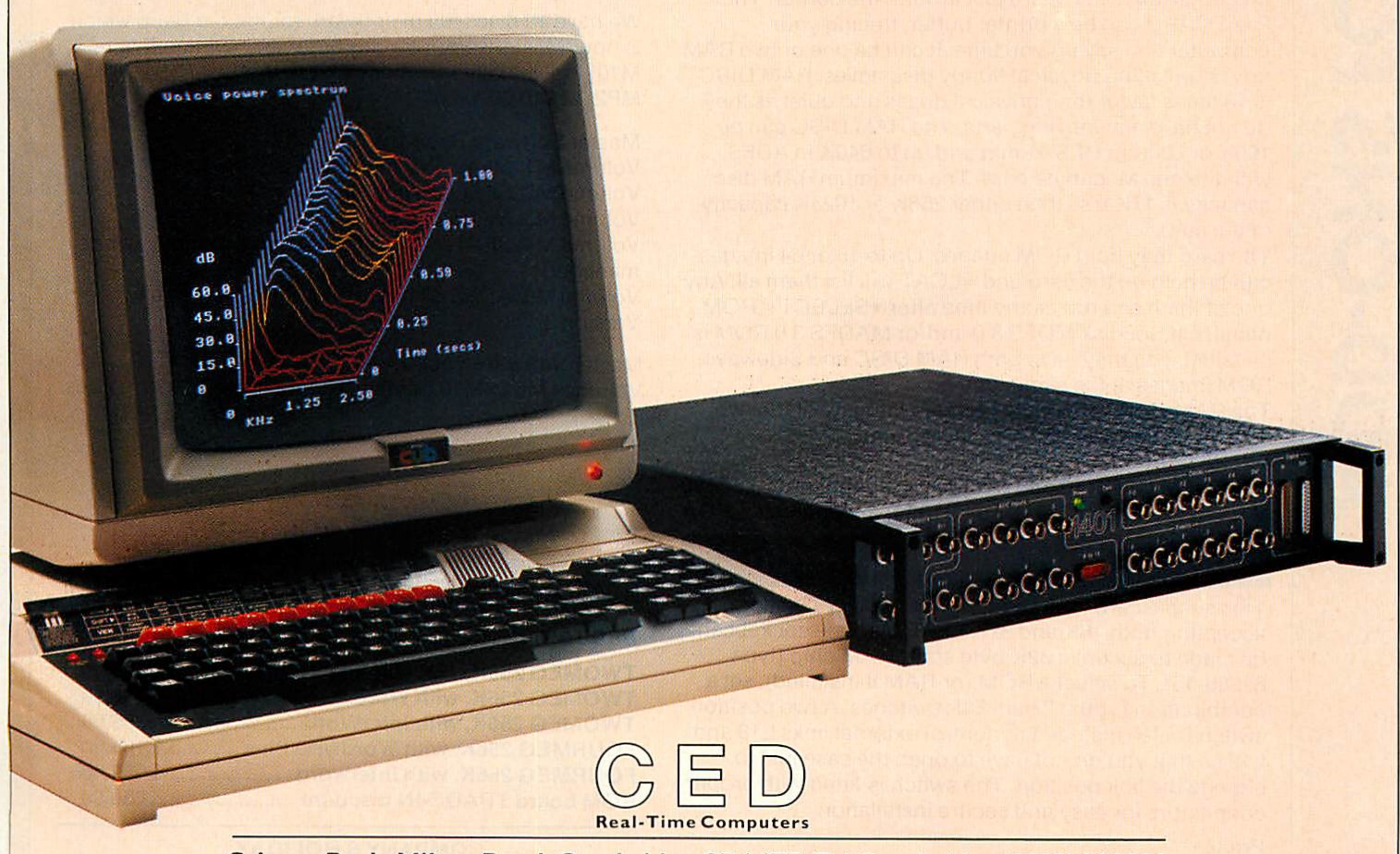
Professional instrumentation with the 1401 intelligent laboratory interface

Compatible with the BBC model B, B+ and the new Master range, and all the Acorn second processors.

- Full 12 bit analogue input and output
- Up to 2 Mbytes of internal memory
- Multi-tasking operation
- Full laboratory software – including FFTs – is included
- Application programs including Spectrum Analyser, Signal Averager, PSTH and INTH.

Designed and made in Cambridge, England

It runs just as fast with the Apple, Apricot, HP, IBM or Nimbus too!



CED

Real-Time Computers

Science Park, Milton Road, Cambridge CB4 4FE. Tel Cambridge (0223) 316186

ONE MEGABYTE OF RAM ON A CARD

ADD-ONS FOR MASTER 128K

More and more software relies on the MASTER 64K Sideways RAM to run, forcing many of us to leave the two links L18 and L19 in RAM position and use only one ROM socket for our ROM software. Standard software cartridges are convenient but they have only 2 ROM sockets and frequent swapping may be necessary. Lastly, 64K is not enough to make an effective RAM DISC.

Solidisk memory cards can solve all those problems and enhance your MASTER still further. The RAM CARD can add up to 1 Megabyte of RAM, the ROM CARD has 4 high capacity ROM sockets and a switch to control the two links L18 and L19.

SOLIDISK MEGA-RAM CARD FOR THE MASTER:

Eight 1-Megabit RAM chips hold this Megabyte of memory and the entire system is completely contained on a single card measuring only 85mm × 95mm — half the size of a postcard — yet it has 8 times more RAM than the MASTER.

The control software is in a 16K ROM, also built-in on the card, which will turn this memory instantly into one or two RAM DISCS, or a printer buffer or simply 64 banks of Sideways RAMs which in turn may contain ROM images.

If you feel that One Megabyte may be too much, we have the same card fitted with 256K memory instead. This is still enough to give you in silicon the equivalent of an 80 track disc drive in DFS format (200K bytes) or 16 Sideways RAM banks. At only £100 inclusive of VAT, you pay less than 40p for each kilobyte. And when 1-Megabit RAM comes down in price, you may get it upgraded to One Megabyte later. We foresee Megabyte RAM cards priced as low as £200 towards MARCH 87 — that's less than 20p a kilobyte. So you see, cheap Megabyte MASTERS are just around the corner. The RAM CARD can be a printer buffer, freeing your computer and saving you time. It can be one or two RAM drives replacing physical floppy disc drives. RAM DISC is 10 times faster than physical drives and quiet as they do not have any moving parts. The RAM DISC can be 100K or 200K in DFS format and up to 640K in ADFS, with the one Megabyte card. The maximum RAM disc capacity is 17K less than either 256K or 1024K capacity of the card.

The card may hold ROM images. Up to 16 or 64 images can be held on the card and ⋆LCAT will list them all. Any one of them can run at any time after ⋆SELECT <ROM name>. If Solidisk MDFS 3.0 and/or MADFS 3.0 ROM is installed, you may have both RAM DISC and Sideways ROM images at the same time.

The RAM CARD is simply plugged into any of the two cartridge slots with the label facing you.

Price:

256K RAM CARD (Code R256) and manual £100
Megabyte RAM CARD (Code R1024) and manual ...POA

SOLIDISK ROM CARD AND T-SWITCH:

This simple card features 4 high capacity ROM sockets, accepting both 16K and 32K EPROMs. One socket can be made to accept a 32K byte static RAM chip (type 62256-15). To select a ROM (or RAM if installed), set a combination for the 2 mini DIP switches. A two position switch is also included to control external links L18 and L19 so that you do not have to open the case just to change the link position. The switch is fitted with proper connectors for easy and secure installation.

Price:

Basic ROM card with T-switch (code R104) £15.00
Same with 32K static RAM fitted (Code R103) £27.00

EPROM PROGRAMMERS AND ERASERS:

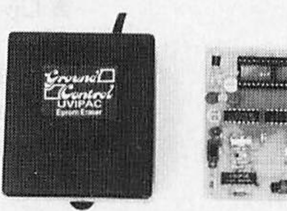
The UVIPROM can program 8K (2764) or 16K (27128) EPROMS from disc files. A software disc (40 track) is supplied and includes a powerful Machine Code Monitor and Disassembler (SOLIMON). A special version — UVIPROM 32-should be ordered to program exclusively 32K (27256) EPROMS.

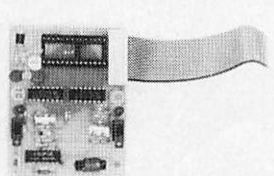
The MULTIPROM is the DE-LUXE version of the basic design, capable of programming all types including 64K (26512/27513) EPROMS, cased and fitted with Textool Zero-Insertion-Force (ZIF) socket. The UVIPAC is an Eprom ERASER which can erase 3 EPROMS of any type in around 15-20 minutes.

Prices:

UVIPROM (Code U16) Eprom programmer for 8K and 16K £20.00
UVIPROM-32 (Code U32) Eprom programmer for 32K £21.00
MULTIPROM (Code UM) Eprom programmer for all types £44.50
UVIPAC Eprom eraser for all Eproms £20.00

Blank Eproms:
8K: £1 each, 16K: £3 each, 32K: £6 each, 64K: £12 each.



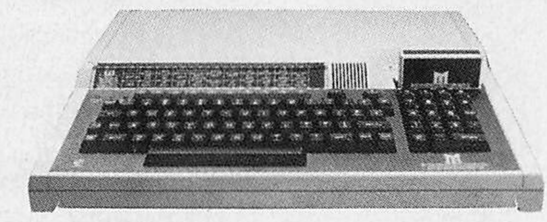


£3 PER DISC OR £10 BY 5 — SOFTWARE FOR SIDEWAYS RAM:

We have 10 discs full of software for the old Beeb which is now 'Masterised'. You can order any volume (M1 to M10) individually for £4 or by pack of 5 discs (MP1 or MP2) at £10.00 each.

Master Software Pack 1:
Volume M1: Menu, Printer, Index, Solimon, Uviprom.
Volume M2: Silexicon and Silexigen.
Volume M3: MACRO BASIC, Linker and Editor.
Volume M4: SFX (special effects) and Soliwin (a window manager).
Volume M5: ADFS 80 track-D/S, Solidisk Datafile Version 3.

Master Software Pack 2:
Volumes M6 to M10 contain around 50 computer games.



BEEB 256K PRICES:

TWOMEG 256K, 16K Manager ROM £115.00
TWOMEG 256K, with Wordwise Plus £145.00
TWOMEG 256K, with InterWord £165.00
FOURMEG 256K, with Wordwise Plus £165.00
FOURMEG 256K, with Interword £185.00
ROM board TRADE-IN discount £30.00

COMPANY'S HOLIDAY:
WE WILL BE CLOSED BETWEEN 25TH DECEMBER TO 2ND JANUARY

SOLIDISK TECHNOLOGY LIMITED, 17 SWEYNE AVE, SOUTHEND-ON-SEA, ESSEX SS2 6JQ. TEL. SOUTHEND (0702) 354674 (16 lines).

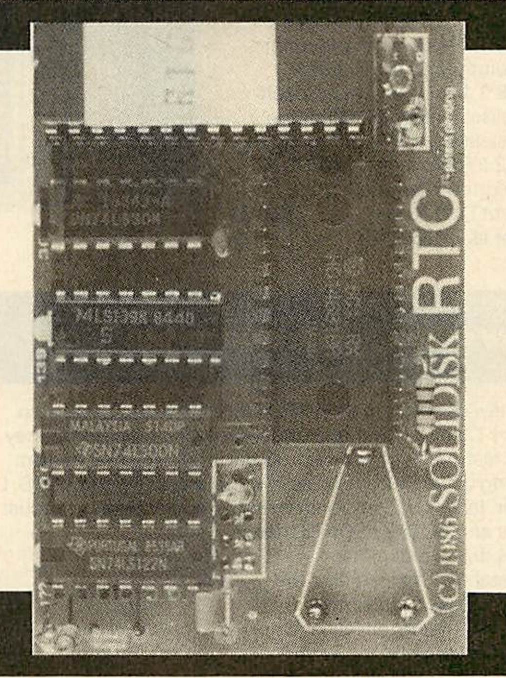
SOLIDISK NEW DEVELOPMENTS

Shadow, Sideways ROM and Sideways RAM All-In-One for £50:

This board, the TWOMEG-32K, is specifically designed with the SCHOOL BEEB in mind so that one could have everything one wanted on a single, compact and extremely easy to install unit. All the necessary software is in a MANAGER ROM (supplied).
The top row of FIVE ROM sockets will take software ROMs, up to 32K each such as used on the BBC Plus and MASTER 128.
The middle row contains 32K of additional CMOS, low power RAM, acting as SHADOW RAM or as two banks of SIDEWAYS RAM.
The empty 40 pin socket will receive either the normal 2MHz CPU or the optional enhanced, faster 4MHz CMOS 65C02 (the board will be then called the FOURMEG-32K).
The TWOMEG-32K combined the usual functions of a Sideways ROM board — offering storage for up to 160K on board and 64K on the Beeb itself (a total 224K out of 256K possible) and a SHADOW RAM compatible with major 'language ROMs' such as BASIC, VIEW, WORDWISE, INTERWORD, VIEW-SHEET, VIEW-STORE etc.
When Shadow RAM is in use, a small 8K of Sideways RAM is available for loading ROM images or a small printer buffer. When SHADOW RAM is not in use, the entire 32K additional RAM can be used as TWO banks of SIDEWAYS RAM or as a RAM DISC (available only with Solidisk DFS or ADFS).
The MANAGER ROM also contains a powerful TOOLKIT to assist PROGRAMMING IN BASIC.
The attraction of the TWOMEG-32K board comes from its versatility, its convenient software in ROM and its low price tag. Furthermore, the board can be fitted with a CMOS 65C02 capable for example of running the new BASIC 4 (some 30% faster than BASIC 2 and also more accurate) or upgraded to FOURMEG speed, comparable to the TURBO board on the MASTER.

TWOMEG-32K	£50.00
65C02 (2MHz) for the above	£10.00
Or upgrade to FOURMEG	£25.00
FOURMEG-32K	£70.00

Real Time Clock & Desk:



The Real Time Clock and Calendar (RTC) can be plugged into any ROM socket on the BBC Model B with absolutely no other connection to make.
The Real Time Clock is powered by a rechargeable battery which should keep the RTC active throughout the Summer Holidays.
Apart from giving the Time and Date, through *TIME or TIME$ (BASIC 4), the RTC has many of the AUTO-CONFIGURE features of the MASTER 128K with the same command syntax, a friendly DESKTOP program for use with the AMX MOUSE, a DIARY and a Calculator.
Many additional commands are background commands, leaving your computer free to run your program. They set the time, display the clock in any screen mode, bleep at specified time, interrupt and show a message when you have an appointment, perform a specified task at specified time etc.
You can even 'Clock Boot' your computer directly into the DESKTOP, using the MOUSE you can operate the computer without touching the keyboard (ATARI-ST style) until you 'click' on a language ROM or an application program. You can pop down the pocket size calculator, change the time and edit your DIARY (instead of using a word processor).
The Real Time Clock will add fun and convenience to the every day use of your BEEB.

Order as CLOCK	£29.00

THE SOLIDISK BOOKCASE

Title	Price
Programming the 6502	16.95
Advanced BASIC ROM for BBC	9.95
Advanced User Guide	15.95
BBC User Guide Binder	4.00
BCPL User Guide	15.00
Introduction to Comal	10.00
Logo Reference Manual	7.50
Termulator Manual	10.00
Lisp on the BBC Micro	10.00
View Guide	5.00
View 3 Manual	10.00
Viewsheet User Guide	10.00
Mastering Amstrad 8256 8512	8.95
dBASE III Advanced prog'ing	21.45
CP/M programmers Encyclop	18.45
CP/M Plus Handbook	13.95
IBM PC-DOS Handbook	17.95
Introduction to Wordstar 2000	17.95
Mastering Wordstar in IBM PC	18.95
Assembly Lang. for the IBM PC	22.95
Business Graphics for IBM PC	9.95
Working with dBASE II	9.95
1-2-3 for Business	16.95
Symphony Tips. Tricks & Traps	19.45
Using 1-2-3 (2nd. Ed.)	18.45
Using Microsoft Word	15.45
Using DOS Plus Amstrad PC	9.95
Programming the 8086/8088	16.95

Title	Price
6502 Development Pack	7.50
Advanced Disc User Guide	16.95
Advanced User Guide Binder	4.00
Forth on the BBC Micro	10.00
ISO Pascal Reference Man.	10.00
Introduction to Logo	10.00
BASIC ROM User Guide	10.00
Micro Prolog Reference Man.	10.00
S-Pascal Manual	7.50
Into View	5.00
Viewstore Manual	10.00
6502 Applications	13.95
Using Word 2000	16.45
dBASE III A Practical Guide	10.95
CP/M Bible	16.50
MS-DOS Bible	19.95
Introduction to Wordstar	17.95
Wordstar Users' Ref. Manual	12.50
Mastering 1-2-3 (2nd Ed)	19.95
Programmers Guide to GEM	19.95
Advanced prog. dB II/III	24.95
Advanced Techniques dBASE II	22.95
Symphony Macros and Cmd Lang	21.45
Turbo Pascal for BASIC Prog's	13.95
Using Lotus Symphony	22.45
dBASE III Plus Handbook (2nd)	18.45
Using GEM on Amstrad PC	12.95

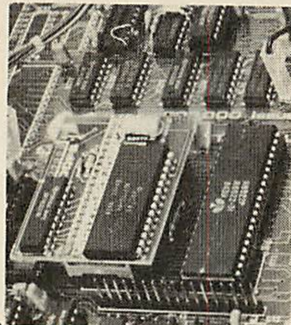
This is just a selection of the books available through the Solidisk Book Case. If you want a Computer title that is in print, please call us for availability and price. Please don't forget to add post and packing to any amount enclosed for an order from the Solidisk Book Case.

SOLIDISK TECHNOLOGY LIMITED, 17 SWEYNE AVE, SOUTHEND-ON-SEA, ESSEX SS2 6JQ. TEL. SOUTHEND (0702) 354674 (16 lines).

SOLIDISK BUDGET DISC SYSTEMS

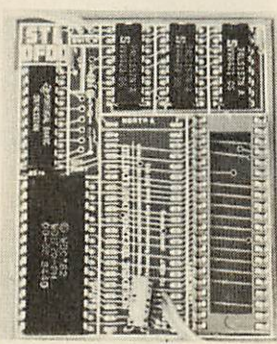
Double density disc interface

Solidisk very popular Double Density Disc Filing System (DDFS) is based on the WD-1770 floppy disc controller, the same chip used on the Beeb-Plus and the Master series, totally hardware compatible with Acorn 1770 DFS and ADFS ROMs. The DDFS is suitable for virtually any type of floppy disc drives, 3½" and 5¼", 40 track and 80 track, single and double-sided with or without power supply unit. New low price without DFS ROM .... £35.00 (order as XR/DDFS)



1770+8271, dual floppy disc controller interface

Solidisk DFDC (1770+8271) is the best seller in disc upgrades for Model B's already fitted with an INTEL 8271 chip (Acorn, Watford, Pace, Viglen, Cumana etc). It plugs into the 8271 socket with the latter relocated on the DFDC itself. This is the most convenient way of adding the modern and powerful 1770 without sacrificing the 8271 chip. The DFDC is fully hardware compatible with both Acorn DNFS 1.2 and ADFS ROMs, as well as Solidisk DFS 2.2 and ADFS 2.1 ROMs. The Acorn DNFS 1.2 is recommended for use jointly with the Solidisk ADFS 2.1 as both systems 'self-frugalise' to keep PAGE at the lowest value. We recommend the DFS 2.2 ROM alone if ADFS is not required. New low price without DFS ROM .... £40.00 (order as XR/DFDC)

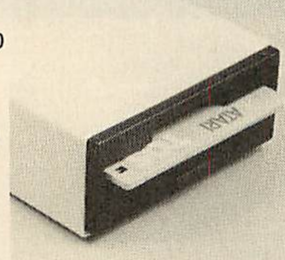


Low cost 3 ½ inch disc drives

The new generation of THIRD HEIGHT 3 and a half inch Floppy Disc Drives offers unprecedented value for money. They feature Double-sided, 80 track per side mechanism offering up to 640K per disc in double density and ADFS. Low power, large capacity, extremely quiet mechanism, robust media and LOWER PRICE than 5 and ¼ drives make them irresistable. They are also the newly adopted Acorn disc standard. Cased, all leads. One year guarantee.

Order as 3.5 INCH-DRIVE (80 track/Double-sided) £90.00

FREE demonstration diskett (double sided) in DFS format while stock lasts (containing a Database, a Word-processor and a selection of games and disc utilities). Separate power supply for BBC Model B, issue 2 or Electron is available at £25.00. Order as 3.5/PSU.



Special leads

A Special set of leads to connect TWO drives in ANY combination of 5¼ and 3½ drives is available separately at only £15.00 or only £8.00 surcharge if supplied in lieu of standard leads. Order as SPECIAL LEADS.

Advanced disc filing system ROM-set (two 16k EPROMS) version 2.1

The finest product yet for any BBC computer fitted with the 1770 Floppy Disc Controller (Model B, Plus and Master 128K and Electron) encompassing many Master 128K specifications. The list of features is so extensive that it would require a lot more space to describe it. In brief, it has ALL the features of the 2.2 DFS ROM except device drivers for the INTEL-8271 chip, full ADFS implementation comparable to the MASTER 128K. Plus ADFS-FORMAT (FORM40, FORM80 and FORM160) and VERIFY. Plus MVDFS and MVADFS to transfer files between DFS and ADFS formats with automatic PAUSE for disc change rendering possible to operate with a single drive. Low PAGE value. Compatible with 6502, Z80, 32016, 80186 (Master version) Second Processor. Two manuals.

Normally £30.00 but if order with DDFS or DFDC only £20.00

Please mention computer model when ordering. Order as ROMS2.1S. Also available on a single 32K EPROM as ROM2.1/32.



Single and double density disc filing system ROM version 2.2

The most powerful and versatile DFS ROM available for the BBC model B, the BBC Plus and the Master 128K. Suitable for both 8271 and 1770 Floppy Disc Controller. Double density allows up to 60% increase over conventional format or 640K storage per (80 track double-sided) disc. Extensive features include 40 and 80 track software switch, unlimited filenames in catalogue (as opposed to Acorn 31), automatic Read after Write. It works with Z80, 6502 second processors and Econet and also is very fast on comparative review benchmarks. Built-in commands include FORMAT (F40 and F80), VERIFY, DZAP, MZAP, RECOVER, RESTORE, WORD, RTRACK, WTRACK etc... Also, ENABLE M allows IBM PC discs to be read or written to. Extensive User Manual covers many technical details. Supplied on 16K EPROM.

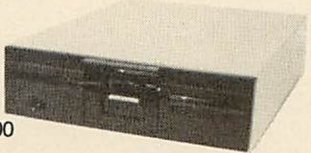
Normally £15.00 but if order with DDFS or DFDC only £10.00

Please mention computer model when ordering. Order as ROM2.2.



Unbeatable quality 5 and ¼ inch disc drives

Also available are NEC or MITSUBISHI 5 and ¼ inch, 80 track, double-sided drives at a very attractive price. Cased in matching cream colour, all leads. Only £109.00



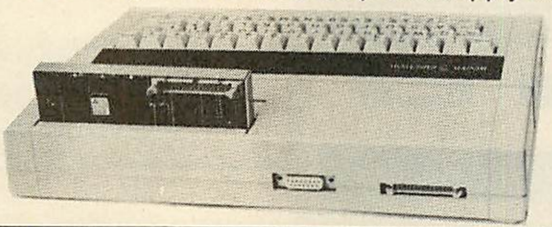
Free bridge unit for twin drive systems

If you pay for two drives on a single order, we will offer you, absolutely FREE this practical BRIDGE unit. Solid steel construction, suitable for all Models of BBC and Master 128K.

SOLIDISK TECHNOLOGY LIMITED, 17 SWEYNE AVE, SOUTHEND-ON-SEA, ESSEX SS2 6JQ. TEL. SOUTHEND (0702) 354674 (16 lines).

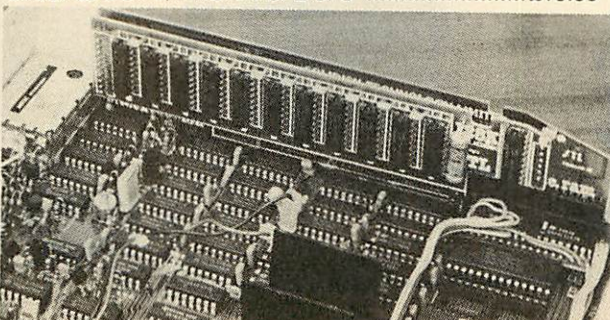
Electron Disc Interface:

This unit (EFS) plugs into the PLUS-1 Expansion and allows connection of a twin disc drive system and a Winchester. The Disc Interface is based on the same WD1770 chip as used on the Beeb. The Electron Disc Filing System software in ROM (32K) is a version of the Solidisk ADFS 2.1 thus offers a large degree of compatibility with Beeb software. The system is capable of both Beeb DFS format (single and double density) and ADFS format as used on the Acorn PLUS-3. The unit also has a 16K of Sideways RAM which can be used to load ROM images. The unit is guaranteed for one full year but we warn the users that the built-in Sideways RAM is UNRELIABLE hence the reduced price of only: .... £50.00.
Use a disc system with built-in power supply unit.



Old Style SWR32 and 128K:

This exceedingly popular system (30,000 plus units sold) enables the Beeb user to load one or two ROM images into the Beeb, make a 16K printer buffer, use DFS with PAGE at &E00, play games, run bigger BASIC, store music and inumerable other uses as supported by a library of 15 software diskettes.
The SWR32 system consists of a BASE UNIT which plugs into the rightmost ROM socket on the BBC board and a (exchangeable) RAM CARD. The RAM CARD also has extension socket for a piggy-back memory board capable of bringing the extra memory to 128K bytes of RAM.
This system is now superseded by the new FOURMEG series and therefore offered at a knock-down price of ONLY £20.00 for a complete unit, excluding software. The 96k add-on piggy-back memory board is also greatly reduced.
Order as SWR32 .... £20.00
Order as SWR128 (SWR32 with 96K extension) . £50.00
NB: Manual supplied but software (not strictly required) not included.
The supportive software is a series of 15 diskettes, available on either 40 or 80 track DFS diskettes. You can buy any number of VOLUMES although we recommend you buy by PACK of FIVE volumes. PACK 1 (volumes 1 to 5) contains general applications such as MENU, PRINTER, DFS0E00, SILEXICON etc. PACK 2 contains programming applications (SOLIMON, SOLITRACE, TELETEXT EDITOR, SPRITES, DFS and ADFS etc). PACK 3 contains exclusively computer games. Each diskette is priced at only £2.00, software PACK is £10.00 for 5 diskettes.
Order as VOL. XX £2.00
Order as SOFT/PACK 1 or 2 or 3 .... £10.00



Secondhand Refurbished Beebs:

As a result of the Solidisk MASTERPLAN, we have to dispose regularly of SECONDHAND, refurbished, complete with Double Density DISC INTERFACE, thoroughly checked and fully guaranteed (Labour only) BBC Model B's. Price vary with issues and ages, commencing from £150.00. Please ring for brochure.



In Brief:

The range of Solidisk Add-Ons for the Beeb is quite extensive. For example: TWOMEG-32K . . . £50.00, FOURMEG-32K . . . £70.00, SWR64 with S/W pack 1 . . . £60.00, SWR128 (new style) with S/W pack 1 . . . £80.00, FOURMEG-256K with WORDWISE PLUS . . . £175.00, DDFS (1770) . . . £35.00, DFDC (1770+8271) . . . £40.00, DFS 2.2 ROM . . . £15.00, ADFS 2.1 ROM set . . . £30.00, 3½ inch (80 track double sided) drive . . . £90.00, 5¼ inch drive . . . £109.00, 20MB Winchester with PSU . . . £745.00, Linemaster communication ROM . . . £10.00, Insight intelligent disassembler ROM . . . £15.00, Solimon machine code monitor ROM . . . £10.00, Toolkit ROM . . . £10.00, S/W pack (1 to 3) of 5 discs . . . £10.00, 2764 EPROM . . . £1.00 each, 27128 . . . £3.00, 27256 . . . £6.00, EPROM programmer for 2764/27128 . . . £19.00, EPROM programmer for 27256 . . . £21.00, EPROM Eraser . . . £20.00.

Order Form

ITEM **PRICE**

1) ....

2) ....

3) ....

ADD post and packing £2.00
(£3.00 for disc drive)

TOTAL:

Name ....

Address ....

....

Access/Visa Account : : : : : : : : : : : : : : : : : :

Send to:
Solidisk Technology Ltd
17 Sweyne Avenue, Southend-on-Sea
Essex SS2 6JQ

We reserve the right to change prices and specifications without notice for improvement

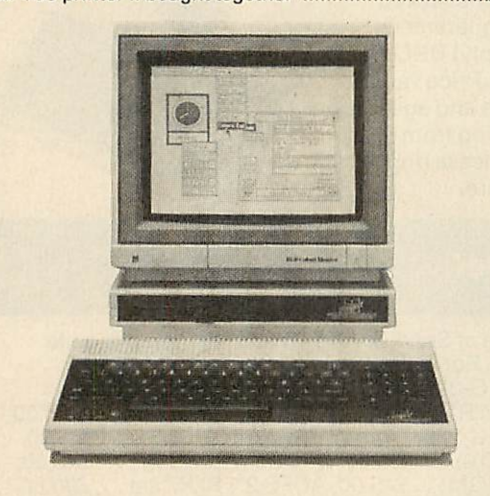
SOLIDISK SALE

SOLIDISK SHOP IN ESSEX

System One: COMPACT

A Master COMPACT 128K, two 80-track, double-sided (1.3 MB) 3.5 inch disc drives (a must even for copying ADFS file to another disc), a choice of Mono or Colour monitor, free Solidisk Double Density DFS Master Version ROM to run thousands of BBC programs, free DATABASE and SPELLING CHECKER disc.

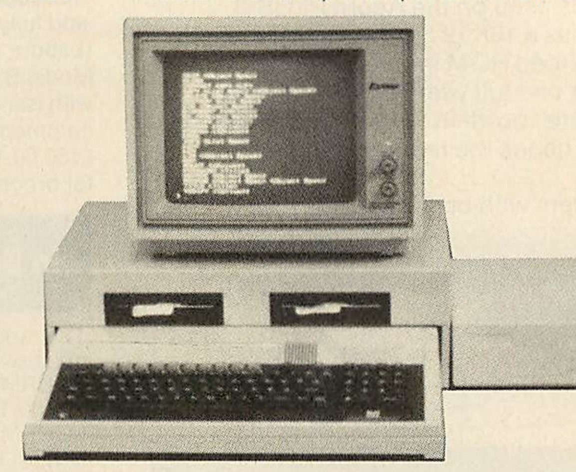
As illustrated with Acorn Mono monitor	£598.00
With Acorn Colour monitor	£749.00
MP165 printer if bought together	£220.00



System Three: MASTER 512K with 80186

A MASTER 128K internally upgraded with the 512K-80186 co-processor, twin 1.3 Megabyte disc drives, 20 MB Solidisk Hard Disc and special ADFS/Double Density DFS ROM, GEM and MASTER software packages.

As illustrated (without monitor)	£1600
With MP165 NLQ printer	£1800
With Juki 6100 Daisy Wheel printer	£1880



Pick any of these Four, and you are sure to get every penny's worth. You'll get more than just the lowest ever prices: a flexible trade-in scheme, free telephone support and free software are in the packs."

System Two: MASTER

A fully blown MASTER 128K, twin 80-track, double-sided 1.3 Megabyte Disc Drives in a bridge unit doubling as a monitor stand, free MEGAGAMES, DATABASE and SPELLING CHECKER in 5 discs.

As illustrated (without monitor)	£660.00
With MP 165 printer, 165 cps, NLQ, EPSON compatible (even the ribbon)	£880.00

System Four: 520 STM

ATARI slogan is 'Power without the Price'. This is specially true with this 520-STM computer, 16 bit 8MHz-68000 CPU and 512K of RAM, hard disc connector, RS232, Midi interface, printer port and Mouse. The bundled software includes GEM (as on the MASTER 512), word-processor, Basic, Logo and CPM emulator. More information is available on request. Two 80 track, double sided 3.5 inch drives (1.5 Megabytes) complete this system.

As illustrated (without monitor), you use your own TV set	£540.00
Special price for MP165 NLQ printer and lead	£240.00
Special low price on 20 MB ATARI ST Hard Disc	POA



SOLIDISK TECHNOLOGY LIMITED, 17 SWEYNE AVE, SOUTHEND-ON-SEA, ESSEX SS2 6JQ. TEL. SOUTHEND (0702) 354674 (16 lines).

Printers

Code	Description	Price
P101	EPSON LX80 + 2 M printer lead	220.00
P101TF	LX80 Tractor Feed	21.30
P101SF	LX80 Cut Sheet Feeder	53.53
P102	EPSON FX85 NLQ + 2M printer lead	350.00
P102TF	FX85 Tractor Feed	30.59
P102SF	FX85 Cut Sheet Feeder	123.50
P103	MP165 — 165 cps + NLQ + 2M printer lead star buy*	260.00
P103R	Black ribbon for LX80, FX85 and MP165	4.60
P104	JUKI 6100 Daisy Wheel + 2 M printerlead star buy*	340.00
P104R	JUKI 6100 black vinyl printer ribbon	2.30
P105	Panasonic KX-P1080 + 2 M printer lead	165.00
P106	Kaga KP 810 + 2 M printer lead	240.00
P100P	2000 sheets cont. paper, A4 size 11"×9.5"	14.00

Monitors

Code	Description	Price
M101	12" Phillips BM7502 hi-res green screen, BNC lead	85.00
M102	12" Phillips BM7522 amber, BNC lead star buy*	86.00
M103	12" TAXAN Supervision 3, hi-res RGB RGB lead	375.00
M104	12" TAXAN Supervision 2, hi-res RGB RGB lead	315.00
M105	14" Mitsubishi XC1404, RGB lead star buy*	260.00

Diskettes

Code	Description	Price
C100	5¼" low cost VEREX for all drives	12.00
C101	5¼" hi-rel MD557, Verbatim DSDD 96 tpi	25.00
C102	3.5" low cost Verbatim for all drives	20.00
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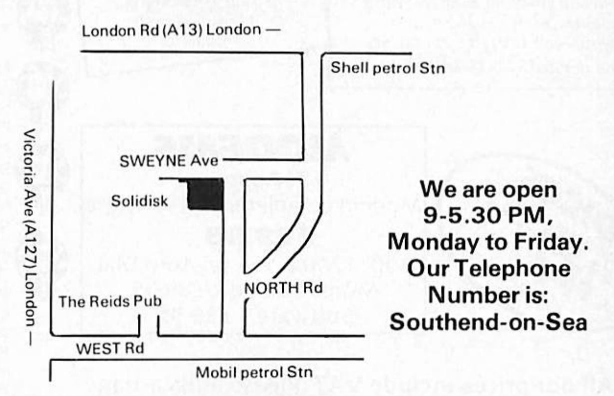
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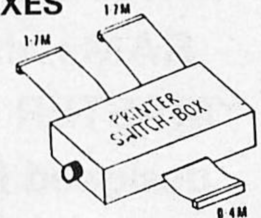
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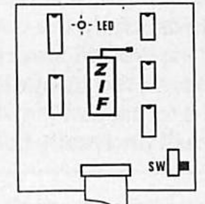
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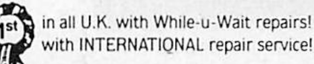


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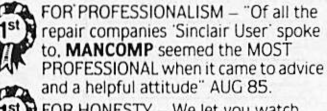

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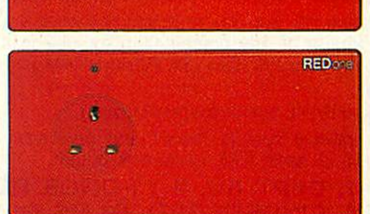
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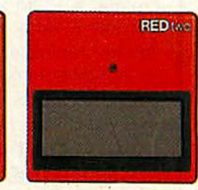
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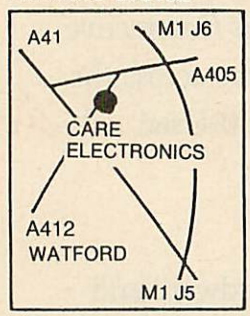


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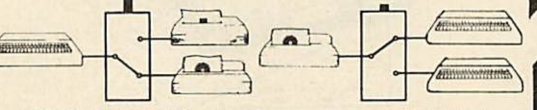
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DATABASE LINKS

The two statistical plotting methods Peter Sandford discussed last month are developed further and linked with databases

Last month's article introduced two graphics programs, one designed to plot statistical data in graph format, and the other to plot and explore the graphs of simple mathematical equations. In the February 1985 issue of *Acorn User*, I also presented routines to plot data in pie chart and bar chart format.

These data plotting routines were all designed to be operated in an interactive manner, with the user entering data manually and adding labels and text as required. This month I will take things a stage further, and look at techniques to produce diagrams automatically, using data extracted directly from a spreadsheet or database. Although I will be concentrating on the use of Acornsoft's *ViewSheet* and *ViewStore*, the programming techniques should be capable of adaption to use data extracted from other software.

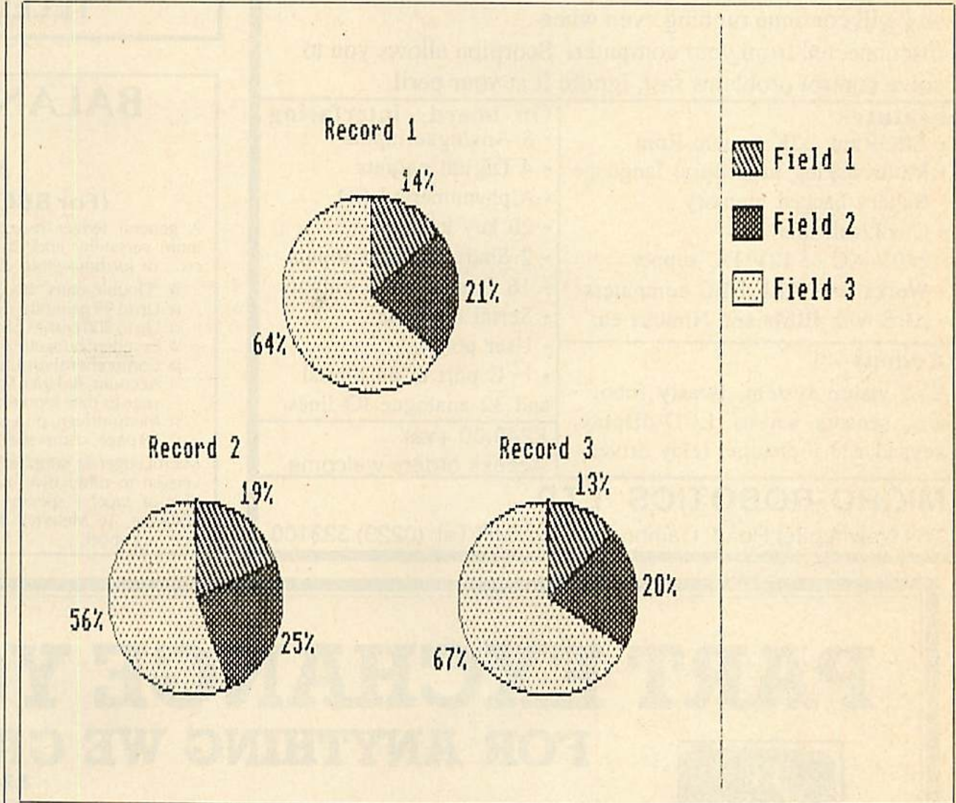


Figure 1a. A sample of the pie chart

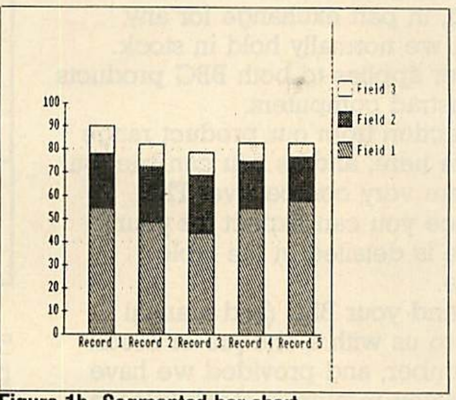


Figure 1b. Segmented bar chart

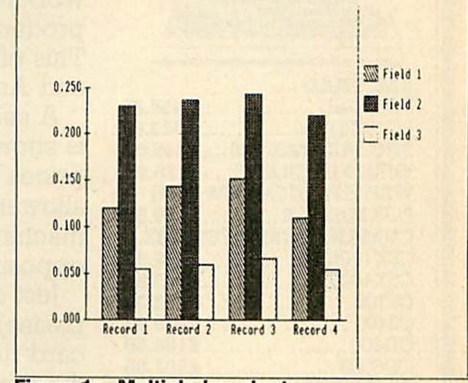


Figure 1c. Multiple bar chart

Database concepts

Before we go any further, it is important that the reader understands some of the concepts used as the basis for all databases. The most important of these is the distinction between a 'field' and a 'record'. A field is a single item of information within the database. A record is a collection of individual fields which are in some way related. For example, they may each contain information about the same person. A database file will consist of a collection of records, each of which will have a similar structure and number of fields.

These distinctions become particularly important when it comes to translating data from a database into some form of graphical presentation. Depending on the type of graph or chart used (such as line graphs, bar charts or pie charts), there will be a direct relationship between the structure of the database and the components of the diagram. These relationships are illustrated in figure 1, which relates the concepts of record and field to each of the four types of diagram presented previously.

These concepts must also be borne in mind when considering data stored within a spreadsheet. A spreadsheet has a less formal structure than a database, but in general terms an individual cell will correspond to a field in the database structure, and a row or column of cells will correspond to an individual record.

To take data out of our database or spreadsheet and convert it into graphical form will involve four distinct stages:

1. Extracting the data. Selecting and, if necessary, sorting the data which will be used to draw the diagram and charts. The number of fields and records to be extracted will depend partly on the type of diagram to be prepared.
2. Storing the data in a format which can subsequently be read by the graphics program. This is most likely to be in the form

of an independent disc file.

3. Analysing the data to determine the parameters for the graph or chart (eg, maximum and minimum values for the axes, number of items of data, etc).

4. Plotting the data.

Stages three and four will simply involve modification of our existing plotting routines to handle data read in from disc, instead of data entered manually by the user. Stages one and two are potentially the most complex and difficult to program. Fortunately for us, *ViewStore* is supplied with a series of versatile utility programs which can take care of these functions, and avoid the need to write our own routines to select and read data directly from the database file. *ViewSheet* also has provision to create linking disc files which can be read independently from Basic.

Linking *ViewSheet*

Chapter 12 of the *ViewSheet* manual (part two) describes the facility to create disc files for passing data between spreadsheets. The format of these files is equivalent to a two-dimensional array, each cell of which maps onto a cell of the spreadsheet.

As an example, consider the simple spreadsheet data shown in figure 2. Columns A, B, C and D show a standard display of monthly sales information for some imaginary business. Before we can transfer this information to a disc file, it is first necessary to create a blank file, using the command CREATE n x y. This sets up a file with the name V.VSn (where n is a number in the range one to 255), and x and y define the dimensions of the file. In this case we have three columns of data, each with 12 cells, so we need a file with dimensions three by 12. The command:

CREATE 1 3 12

would set this file up as V.VS1.

Cells F4 to H15 are used to 'map' the spreadsheet data of columns B, C and D onto the disc file (note that this 'map' could be located anywhere on the spreadsheet). Slot G15, for instance, is used to transfer data from C15 into location (2,12) of the disc file. The 'Write' function is used to transfer the data to disc. The contents of G15 would read:

WRITE (1,2,12,C15).

It can be quite laborious to set up these commands for all of the 36 cells to be copied into the disc file. Fortunately, *ViewSheet* allows us to take a short cut using the 'Replicate, Row and Col' functions, as indicated on page 126 of the manual. In the example shown in figure 2,

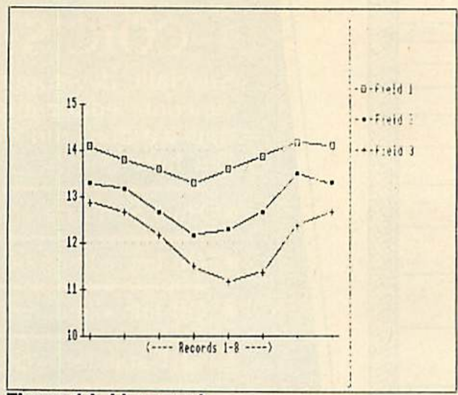
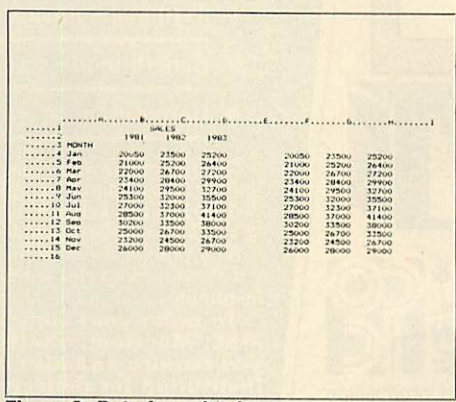


Figure 1d. Line graph



	A	B	C	D	E	F	G	H
1		SALES						
2		1981	1982	1983				
3	MONTH							
4	Jan	20050	23500	25200		20050	23500	25200
5	Feb	21000	25200	26400		21000	25200	26400
6	Mar	22000	26700	27200		22000	26700	27200
7	Apr	23400	28400	29900		23400	28400	29900
8	May	24100	29500	32700		24100	29500	32700
9	Jun	25300	32000	35500		25300	32000	35500
10	Jul	27000	32300	37100		27000	32300	37100
11	Aug	28500	37000	41400		28500	37000	41400
12	Sep	30200	33500	38000		30200	33500	38000
13	Oct	25000	26700	33500		25000	26700	33500
14	Nov	23200	24500	26700		23200	24500	26700
15	Dec	26000	28000	29000		26000	28000	29000
16								

Figure 2. Data from database

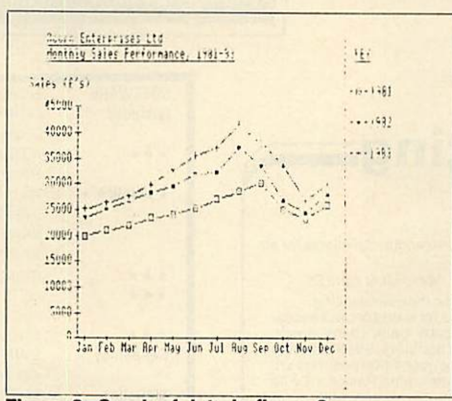


Figure 3. Graph of data in figure 2

simply enter the command

WRITE (1,COL-5,ROW-3,B4)

into slot F4. Now use function key 0 to replicate this slot vertically. Enter:

F4-F5F15

in response to the 'From-To?' prompt. Then repeat this to replicate F4 to F15 into columns G & H by entering:

F4F15-G4H4

Press R in response to all prompts for R (Relative) and N (No change).

Having set up our spreadsheet in this way, disc file V.VS1 will automatically be updated whenever new data is entered and the sheet recalculated. What we need now is software to read this file and transfer the data to the graphics program.

Listing 1 offers two routines to perform this function for any file in *ViewSheet* format. PROCevaluate reads through the file, returning the dimensions of the file (xc and yc), and the minimum and maximum values of data stored in it (min and max). FNread is used to read single value from co-ordinates (x,y) of the file. Note C% should be used as the channel number, and that the file should be open when calling FNread.

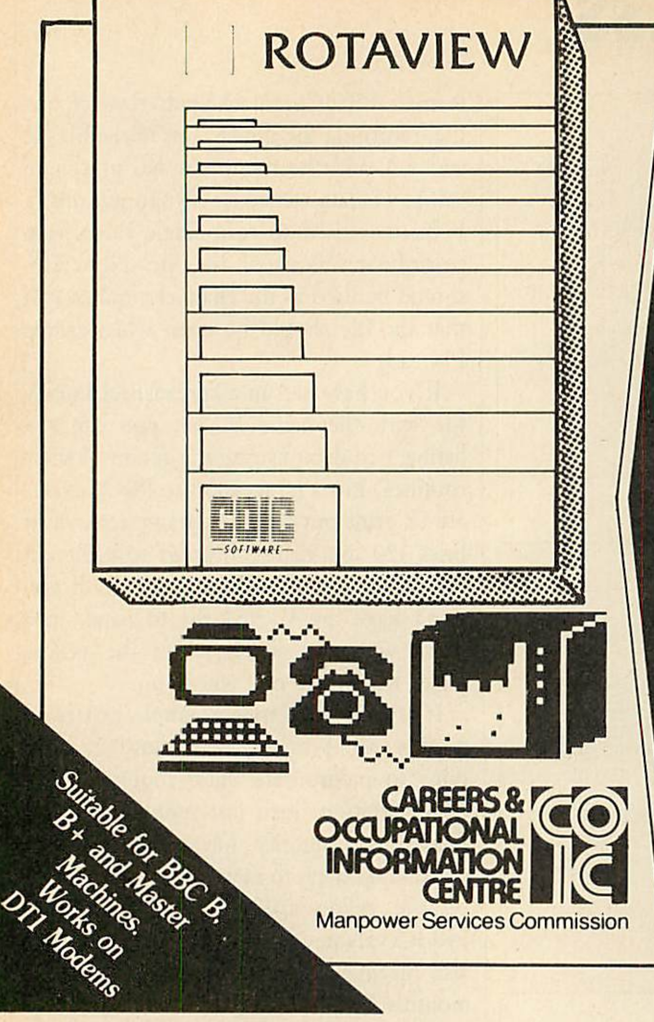
If you have set up a spreadsheet linking file with the name V.VS1, you can run listing 1 to demonstrate the action of these routines. Lines 60 to 100 use PROCevaluate to print out the file parameters, whilst lines 120 to 190 use FNread to print out the contents of V.VS1 in sequence. If you don't have the V. VS1 file to hand, then don't worry as listing 5 on the yellow pages will create one when run.

It is now a relatively simple matter to modify the previous data plotting programs to incorporate these routines. As a demonstration, load last month's *Dataplt* listing, and modify lines 2070 to 2260 (PROCplotdata) to match those of listing 2 on the yellow pages. Add FNread and PROCevaluate from listing 1. You will also need to add FNinterval from last month's *Graplt* listing.

If you have shadow screen memory, a second processor or a Master, the extended listing should run without modification. If you have an unexpanded BBC B, you will need to compact the program to enable it to run (see program notes for details). A compacted version is included in this month's listings disc/cassette. Note that PAGE must be set to at least &1300 to accommodate the disc data file.

Figure 3 illustrates the output of the amended *Dataplt* routine when run in conjunction with the linking file V.VS1 set up with the data from figure 2. Note, although the graph plotting is handled automatically, it is still necessary to label the graph axes and key manually. This is perhaps the biggest limitation of using *ViewStore* format linking files – they can only transfer numeric data, and not string data or text.

To conclude this section on the use of *ViewSheet*, it is worth making two observations. First, although it is straightforward to set up a linking file and extract data for use by our chosen graphics routine, it does require considerable care from the user in setting up the original spreadsheet and linking file. Second, the inability to pass text labels means these must either be added manually by the user, or must be programmed into the plotting



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routine (eg, by using data statements). These two limitations suggest that *ViewSheet* linking files are best used for standard diagrams, where the format and labelling will remain constant.

Linking *ViewStore*

ViewStore is supplied with a series of powerful supporting utilities which can be used to extract and manipulate data stored in the database. Three of these are of particular relevance here:

- Select: Extracts and, if required, sorts selected items of data from the database.
- Link: Creates a linking file in *ViewSheet* compatible format.
- Macro: Extracts information and converts it into a format which can be read into *View*.

Referring back to the four stages involved in generating graphics from a database, as outlined earlier in this article, you will see that the Select utility takes care of stage one, the extraction and sorting of data. The utilities Link and Macro take care of stage two.

Chapter three of the *ViewStore* manual (page 41) explains the use of Link to create files in *ViewSheet* format. These can be read in exactly the same manner as outlined above, using PROCevaluate and FNread of listing 2. If you wish to transfer only numeric data, this is perhaps the simplest and most straightforward technique. However, the inability to transfer string data poses the same limitations as when using *ViewSheet*. It is particularly annoying when you discover that data stored in *ViewStore* 'date' format cannot be treated as numeric data, and cannot be passed via the linking file.

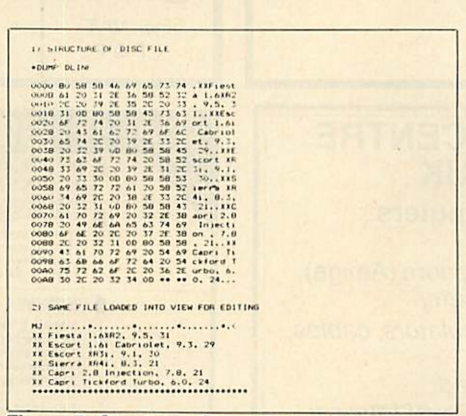
The Macro utility offers a second, more versatile method of transferring data from our database. It allows both text and numeric values to be extracted and stored in a disc file. Using *View*, it is also possible to edit data.

To illustrate the use of macro, enter *ViewStore* and load in the 'Cars' database supplied for demonstration. Suppose we wish to prepare a bar chart to compare the acceleration and fuel consumption of Ford's sportiest models. Follow the dialogue shown in figure 4. This uses the Select utility to extract data on all Ford vehicles with a zero to 60 acceleration of 9.5 seconds or less. Note the extra selection criteria 'Acc>0' – this needs to be included to prevent Select from including records, utility macro is then used to set up a linking file called 'DLINK', containing the fields called 'model', 'acceleration', and 'miles per gallon'.

```
=>UTILITY SELECT
SELECT
List or create select file (L,F)? F
Select criteria? Manufacturer=Ford
Select criteria? AND
Select criteria? Acc>0 AND Acc<=9.5
Select criteria? <RETURN>
Sort field? Acc
Sort field? <RETURN>
Key width: 4
Ascend or Descend (A,D)? D
Selecting.........................
6 records selected out of 218
SORT
Sorting....

=>UTILITY MACRO
MACRO
Use select file (N,Y)? Y
Field 1? Model
Field 2? Acc
Field 3? Mpg
Field 4? <RETURN>
3 fields
Two letter macro? XX
Output filename? DLINK
Creating macros........
8 records processed
0 fields split
```

Figure 4. Extract from 'cars' database



```
1) STRUCTURE OF DISC FILE

*DUMP DLINK

0000 80 58 58 46 69 65 73 74 .XXFiest
0008 61 20 31 2E 36 58 52 32 a 1.6XR2
0010 2C 20 39 2E 35 2C 20 33 , 9.5, 3
0018 31 0D 80 58 58 45 73 63 1..XXEsc
0020 6F 72 74 20 31 2E 36 69 ort 1.6i
0028 20 43 61 62 72 69 6F 6C  Cabriol
0030 65 74 2C 20 39 2E 33 2C et, 9.3,
0038 20 32 39 0D 80 58 58 45  29..XXE
0040 73 63 6F 72 74 20 58 52 scort XR
0048 33 69 2C 20 39 2E 31 2C 3i, 9.1,
0050 20 33 30 0D 80 58 58 53  30..XXS
0058 69 65 72 72 61 20 58 52 ierra XR
0060 34 69 2C 20 38 2E 33 2C 4i, 8.3,
0068 20 32 31 0D 80 58 58 43  21..XXC
0070 61 70 72 69 20 32 2E 38 apri 2.8
0078 20 49 6E 6A 65 63 74 69  Injecti
0080 6F 6E 20 2C 20 37 2E 38 on , 7.8
0088 2C 20 32 31 0D 80 58 58 , 21..XX
0090 43 61 70 72 69 20 54 69 Capri Ti
0098 63 6B 66 6F 72 64 20 54 ckford T
00A0 75 72 62 6F 2C 20 36 2E urbo, 6.
00A8 30 2C 20 32 34 0D ** ** 0, 24...

2) SAME FILE LOADED INTO VIEW FOR EDITING

MJ .......*.......*.......*.......*.<
XX Fiesta 1.6XR2, 9.5, 31
XX Escort 1.6i Cabriolet, 9.3, 29
XX Escort XR3i, 9.1, 30
XX Sierra XR4i, 8.3, 21
XX Capri 2.8 Injection, 7.8, 21
XX Capri Tickford Turbo, 6.0, 24
************************************
```

Figure 5. Structure of macro parameter file

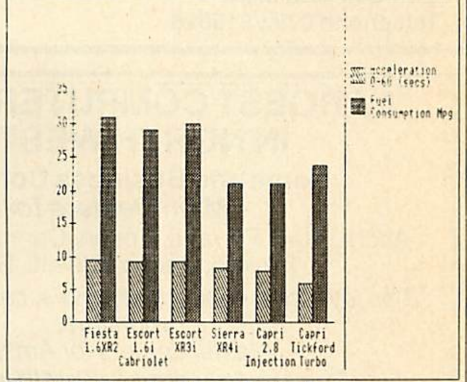


Figure 6. Bar chart from figure 5

This linking file is structured to enable it to pass these fields as parameters to a *View* macro. As illustrated in figure 5, the data is stored in ASCII format. Each record begins with the code &80, followed by two bytes containing the macro identifier XX. The record is terminated by a carriage return (ASCII &0D). Each field within the record is separated by a comma.

Listing 3 offers two routines which can be used to read a *View* macro file in a similar manner to those used for *ViewSheet* linking files in listing 1. PROCevaluatemacro will check through the contents of the file, counting the number of fields and records, and returning the minimum and maximum data values in the variables min and max. FNreadmacro is used to read each entry in turn, returning it as a string variable. Numeric values should be converted using VAL, as in lines 300 & 310.

Note that line 430 checks the first character of each field to see if it begins with a < character. This is required because the Macro utility adopts the convention of enclosing any entry within <> delimiters if the original text itself contained one or more commas in it. In this case the end of the field will be terminated not by a comma, but by the ASCII code for the > character instead.

Note also that the characters used for the macro identifier (XX in this case) are simply skipped over and are not at all significant in any way.

The only significant drawback in using macro linking files to transfer our data arises from the fact that we cannot access



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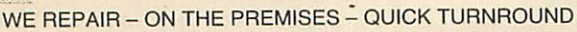
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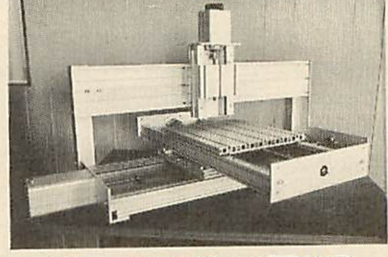
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the data in true random access fashion (as for *ViewSheet* format linking files), since the length of each entry is variable. Instead, each item of data must be read in sequence. However, this minor inconvenience is more than offset by the advantages of being able to transfer text to our diagram. Another major advantage is the ease with which data can be edited or amended, simply by loading it into *View*, editing it, and saving it again to disc.

Alert readers may already have noticed that two minor amendments have been made to the data shown in figure 5. The last two model names have been edited down to three words in length from the original database entries, to reduce the amount of space they will need in the final bar chart. Dummy data files can also be created easily from *View* for use for demonstration purposes. However, if you do wish to edit or create macro files, take care to ensure that no extra carriage returns are included in the text as these will cause the number of records to be c nted incorrectly by PROCevaluatemacro.

Now we can use the new routines to draw our bar chart. Listing 4 is based on last month's *Dataplt* listing. This is a new version of listing 3 from my February 1985 article, with the addition of a new procedure, PROClabelx. This is used to plot the text labels stored as the first entry in each 'line' of DLINK. Each label can be up to three words long, and is plotted centrally underneath the relevant group of bars.

Before running the new program, make sure that you have the macro data file 'DLINK' and the 'DOTFILL' machine code routine stored on the same disc. All being well, you will be rewarded with a diagram similar to that shown in figure 6.

Note that you will still need to manually input the titles for the two key entries ('Acceleration 0-60 (secs)' and 'Fuel Consumption mpg'). A very simple modification can be made to PROCdrawkey to allow these titles to be read in automatically from a predefined disc file. Change lines 2530, 2560, and 2580 to read as follows:

```
2520 DEF PROCdrawkey
2530 PROCwindow(2):C%=OP
ENUP"DKEY"
2540 FOR P%=1 TO fields-
1
2550 PROCbox(P%,tone%(P%
))
2560 PROCtext(P%,FNreadm
acro)
2570 NEXT
2580 PROCwindow(1):CLOSE
#C%
2590 ENDPROC
```

```
MJ .......*.......*.......*.......*.<
XX Acceleration 0-60 (secs)
XX Fuel Consumption Mpg
************************************

Enter the text into VIEW exactly as
shown above, with no extra lines.

Save it to disc under the filename
'DKEY'.
```

Figure 7. Operating a labelling macro

```
Figure 8: Simulating a VIEW macro parameter file from WORDWISE

start
[illegible]
End

Enter the text into Wordwise exactly as shown above. Then return to the
main menu, and SPOOL the text using menu option 8. Enter DLINK as the
filename.

The macro file DKEY can be created as follows:

start
OC128 XXAcceleration 0-60 (secs)
OC128 XXFuel Consumption Mpg
End
```

Figure 8. Simulating a *View* macro

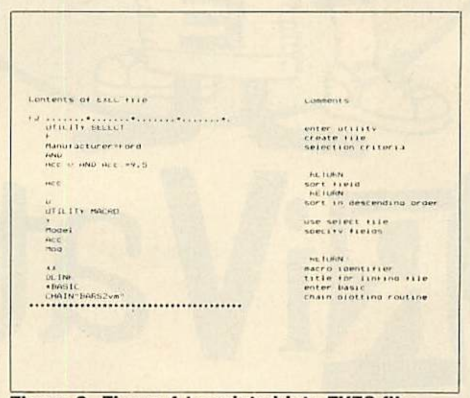


Figure 9. Figure 4 translated into EXEC file

The procedure in its modified version will now read in any text stored in a *View* macro format file under the filename 'DKEY'. Create a file from *View* exactly as shown in figure 7. Modify PROCdrawkey as shown above, and rerun the bar chart program.

The bar chart routines in listing 4 can be used to plot any data stored in macro format under the filename 'DLINK'. Each record should be stored with its title first, followed by a maximum five fields of numeric data.

The main practical limitation is the space available for labelling each record along the X axis. Labels that are particularly long are likely to overlap if there are too many records, in which case you will either have to edit or abbreviate the labels in *View*, or think of labels with fewer characters, or plot a reduced set of data.

Other databases

The techniques outlined above can easily be adapted to allow data to be extracted from other databases and used to create a source file for graphics. Provided the data can be extracted in the form of an ASCII file, it can then be read into *View*, and then edited into macro parameter format (see figure 5). Keep to the same conventions of separating each field with a comma (enclosing it within <> delimiters if necessary), and keep each record to one line. Use Shift-f8 (edit command) to enter the macro identifier (XX) at the start of each line, and ensure that no blank lines are left at the beginning or end of the text. Then simply save the text under the filename DLINK and finally chain the graphics routine.

Users of *Wordwise* can create simulated *View* macro files quite easily. As indicated in figure 8, each line of text (ie, each record) should begin with the command OC128, followed by the two character macro identifier (in this case XX). If this text is then spooled from the main menu, the file created will have the same format as a *View* macro.

If you are going to use *Wordwise* exclusively, and are not going to read files created from *ViewStore*'s macro utility, you could also dispense with the two character macro identifier if you wish. In this case, line 420 of FNreadmacro (listing 3) should be amended to:

```
420 data=BGET#C%:IF data=&80
THEN data=BGET#C%
```

Developing routines

In this series of articles, I have provided a range of interchangeable procedures and functions which can act as the building blocks for a sophisticated suite of graphics routines. It should be reasonably straightforward to develop these for your own purposes, and to modify them to produce variations such as three-dimensional pie charts, bar charts and horizontal bar charts.

Remember that EXEC files can provide a very powerful method of automating the execution of your software. For instance, the dialogue shown in figure 4 can be translated into an EXEC file as shown in figure 9. If this is stored to disc and then executed from *ViewStore*, it will set up the linking file DLINK, enter Basic, and then run the bar chart plotting routine without any further intervention, assistance or help from the user.

Turn to the yellow pages index on page 113 for details of where to find Peter Sandford's listings.

EDUCATION

NEWS

Desktop discoveries

Desktop from LTS featured in January's Education News is capable of even more feats than at first expected.

This fully-integrated package can pass data from one of its facilities to another without modification. Thus, data in the database may be analysed in the graphics package and the resulting graph printed in a report created on the wordprocessor.

Enthusiastic users have discovered the database structure is identical to *ViewStore*. Fields are separated by a Tab character and records by Return. *ViewStore* data files may be 'imported' into a pre-designed structure.

The mode 4 graphics capability, theoretically just for graphs based on database analysis, is also capable of supporting any mode 4 graphics screen.

Since the launch of *Desktop* LTS has been inundated with orders from network users. It is network compatible and can be used on stand-alone machines.

Desktop costs £94.95 from LTS, Haydon House, Alcester Road, Studley, Warwickshire B807AN. Tel: (0386) 792617.

Programs for infants

by Nick Evans

Infant programs are noticeable by their absence in many software publishers' catalogues. Reasons are varied including lack of inclination by infant teachers, lack of understanding by software writers and problems with keeping text simple.



Programs for this area have nearly always failed to fit into any developmental scheme. However, J&G Software has overcome this by creating a coherent course of materials based firmly on developmental principles. The programs are simple, clear and effective and are received just as enthusiastically by pupils and teachers as the fancy graphic packages.

J&G offers three suites of programs dealing with numbers, reading and logic. Matching and relating shapes, designs and colours is achieved by simple 'snap' games. Comparative counting with assisted counting when the child makes an error, observation and basic calculation are also covered. The skills of ordering, and number bonding are practised and the ideas used stem directly from the apparatus present in any infant classroom.

The *Number* package is £60, *Logic* is £30 and *Reading*, £30. The programs are available from J&G Software, 44 Burgess Road, Brigg DN20 8DA.

Secondary school option choice

With the prospect of option choices for third year secondary pupils looming in the next three or four months it is worth drawing schools' attention to a package published by CRAC (Careers Research and Advisory Centre) through Hobsons of Cambridge. The program is a decision-making tool which demonstrates the relative importance of particular subjects, the relationships between subjects and particular careers and the consequences of ignoring specific subject areas.

The centre claim the program provides information and assistance on courses and subjects available for CSE and GCE, selection and grouping subjects to suit needs and interests, how subjects relate to different jobs, careers directly linked to subjects and danger signs.

The package comes complete with tutor's notes and 10 copies of the student's workbook. Also included is a copy of *Decisions at 13/14* by Michael Smith and Veronica Matthew. This book has been around for some time but this new edition brings the content up to date and relates everything to GCSE provision. The book is carefully structured to guide pupils in career choice.

The complete package costs £45 and is available from Hobsons Limited, Bateman Street, Cambridge CB2 1LZ.

EDUCATION TOP FIVE

	Title	Publisher	Cassette	Disc	ROM	Electron	B+	Master	6502	Econet
1	Answer Back Junior	Kosmos	£6.95	£10.95 (5.25in) £12.95 (3.5in)	—	Yes	Yes	Yes	—	—
2	French Mistress	Kosmos	£8.95	£9.95 (5.25in) £19.95 (3.5in)	—	Yes	Yes	Yes	Yes	Yes
3	Best 4 Language	ASK	£19.95	£19.95	—	Yes	Yes	Yes	—	—
4	Number Chaser	Acornsoft	£6.99	£11.50	—	Yes	Yes	—	—	—
5	Word Skill	Chalksoft		£14.25	—	—	Yes	Yes	—	—

Compiled by Gallop/MicroScope. Publishers: Kosmos Software, 1 Pilgrims Close, Harlington, Dunstable, Beds LU5 6LY; ASK, London House, Upper Richmond Road, London SW1S; Acornsoft, 645 Newmarket Road, Cambridge CB5 8PD; Chalksoft, PO Box 49, Spalding, Lincs PE11 1NZ.

Telesoftware program

All the pages on a specific topic on the BBC's Ceefax can be accessed using a new program from BBC Telesoftware.

Rather than viewing pages by typing in page numbers, the new program works by simply typing in a keyword and all the pages containing that keyword will be accessed. The program constantly scans Ceefax storing the pages when the keyword is located. Up to 10 pages can be stored at any time.

The keyword can be changed simply by keying in a different word and broadcasts will begin at Christmas and will be repeated in early 1987.

The program works with the BBC micro but you must also have Acorn teletext adaptor.

Advanced techniques also allow for half the page to be expanded to double height display, especially helpful for viewing in a large classroom.

For further information contact: BBC Enterprises, Room A3080, Woodlands, 80 Wood Lane, London W12 OTT.

Tinkling the ivories

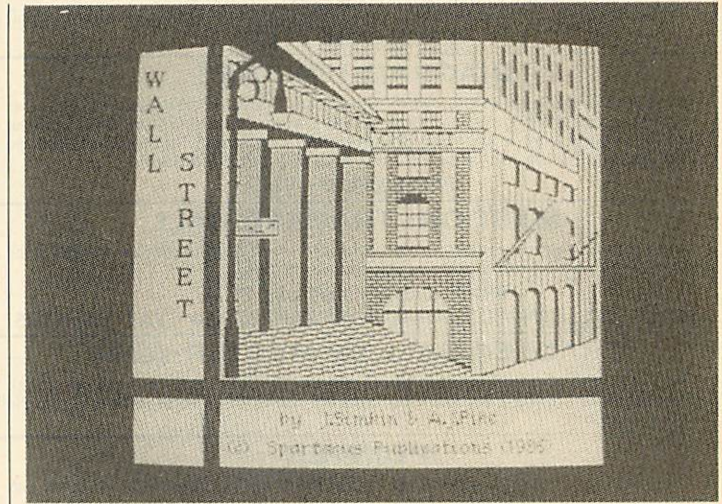
An interesting package from Chalksoft tutors young musicians in the techniques of playing electronic keyboards. *Keyboard Player* is designed to be used in conjunction with a keyboard which does not need to be linked to the computer. It introduces the idea of melodies, simple chords, the use of rhythm and correct fingering technique. As a primer this makes an interesting start for young players.

Keyboard Player costs £17.35 and is available from Chalksoft, PO Box 49, Spalding. PE11 1NZ Tel: (0775) 69518.

Reds in Wall Street

Spartacus Educational Publishers provides an interesting addition to historical simulation software. Spartacus has created a variety of simulations, two of which deal with the Russian Revolution and the Wall Street Crash.

However, simulating fact can be problematic. *1914*, an early attempt at this type of program, was very successful. It allowed the pupil to make the wrong decision, see the consequences of their action and then demonstrate what actually happened. Spartacus approach the problem in a slightly different fashion. If, for example, the pupil decides to storm the Winter Palace early on in the simulation then they are unlikely to be successful. This is the factual reality and so the revolution will fail. In that respect it is up to the pupils to find the best route through the possible activities which then lead to an understanding of the events and the consequences that each has for its successor.



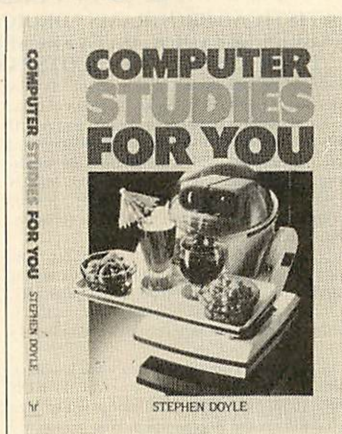
***Wall Street*: a program that doesn't crash**

The package is supported by a printed map and an option to purchase the Modern World History – Evidence and Empathy booklet *The Russian Revolution*. This provides the necessary background material.

Wall Street costs £10 plus VAT and the *America in the Twenties* booklet is 95p. *The Russian Revolution* program and booklet are similarly priced. Spartacus Educational Publishers, 139 Carden Avenue, Brighton BN1 8NH.

Micro studies

Choosing a text book for computer studies it is likely to be fraught with problems including finding the right reading level. Many authors write as they think and speak, in rather high-flown language, which passes over the heads of the pupils. A fine attempt at putting the complex ideas and concepts of computer-speak into every day language has been made by Stephen Doyle in his *Computer Studies For You* course book. It is claimed that the reading age does not rise above fifteen years and the glossary helps with all terms in need of explanation. The author builds upon knowledge he expects readers to have gleaned so in earlier chapters.



It is aimed at GCSE as well as current CSE and 'O' level courses and is very good value at £4.95 per copy. There is a wealth of visual material in the book and it covers all relevant aspects of computer studies.

Computer Studies for You is published by Hutchinson Education, Brookmount House, 62–65 Chandos Place, Covent Garden, London WC2N 4NW.

Health education viewdata

Healthdata, a free viewdata service covering the health and health education areas, would be a useful addition to science, biology and health courses in both secondary schools and colleges of higher education.

The 'modems in schools' programme has allowed many schools to access remote databases for teaching purposes.

Healthdata is available 24 hours a day on 01–986 4360 (1200/75 like Prestel). No password needed.

PINEAPPLE SOFTWARE

Programs for the BBC models 'B' with disc drive with FREE updating service on all software

DIAGRAM

Still the only drawing program available for the BBC micro which gives you the ability to draw really large diagrams and scroll them smoothly around the screen stopping to edit them at any time if required.

Pineapple's unique method of storing the diagram information on disc means that the size of diagrams is limited only by the free space on disc, and not the amount of computer memory you have available. (A blank 80 track disc will allow up to 39 mode 0 screens of diagram).

The superb print routines supplied with the program enable large areas of the diagram to be printed in a single print run in a number of different sizes and rotated through 90 deg. if required. Full use can also be made of printers which have a wider than normal carriage available.

The program is fully compatible with the Marconi Tracker ball described below.

PLEASE STATE 40 or 80 TRACK DISC & WHETHER STANDARD BBC or MASTER VERSION IS REQUIRED

PRICE £25.00 + VAT

DIAGRAM UTILITIES

A suite of six utility programs which add additional features to the 'Diagram' drawing program. The utilities include the saving and loading of areas of diagram to and from disc. The ability to display the whole of your large diagram on the screen at one time (in either 4★4 or 8★8 screen format). The addition of borders and screen indents to diagrams, and the ability to shift a whole diagram in any direction.

PRICE £10.00 + VAT

MARCONI TRACKER BALL

This high quality device comes with it's own Icon Artmaster drawing program and utilities to enable it to be used in place of keyboard keys, joysticks, or with your own programs.

PRICE £60.00 + VAT p&p £1.75

PRICE INCLUDING 'DIAGRAM' SOFTWARE £79.00 + VAT p&p £1.75

TRACKER BALL for MASTER series

The Pointer ROM is supplied instead of the Icon Artmaster disc and enables the Tracker ball to work directly with the MASTER series computers. (e.g. to use with TIMPAINT etc.). Prices are the same as for the standard tracker ball.

POINTER

The Pointer Rom is available separately for people already owning tracker balls, and comes with instructions for use with the MASTER computer.

PRICE £12.50 + VAT

PCB

This new release from Pineapple is a printed circuit board draughting aid which is aimed at producing complex double sided PCB's very rapidly using a standard BBC micro and any FX compatible dot-matrix printer.

The program is supplied on EPROM and will run with any 32k BBC micro (including Master series). Also supplied is a disc containing a sample PCB layout to demonstrate the programs features.

By using an EPROM for the program code the maximum amount of RAM is available for storing component location and ASCII identification files etc. (Up to 500 components and 500 ASCII component descriptions may be stored for a given layout). These is no limit to the number of tracks for a given PCB, although the maximum size of board is restricted to 8" * 5.6".

Using a mode 1 screen, tracks on the top side of the board are shown in red, while those on the underside are blue. Each side of the board may be shown individually or superimposed. A component placement screen allows component outlines to be drawn for silk screen purposes and component numbers entered on this screen may be displayed during track routing to aid identification of roundels.

The print routines allow separate printouts of each side of the PCB in a very accurate expanded definition 1:1 or 2:1 scale, enabling direct contact printing to be used on resist covered copper clad board.

This program has too many superb features to describe adequately here, so please write or 'phone for more information and sample prinouts.

PRICE £85.00 + VAT

CONVERTER LEADS

Converter leads to enable the Trackerball to run mouse software and the mouse to run trackerball software (inc. DIAGRAM). Please state which way round when ordering.

PRICE £8.00 + VAT

MICROSPICE

A new addition to our range of engineering software. Microspice is a very powerful DC and AC analogue circuit simulator package for any model BBC computer.

As well as all the usual facilities available with this type of program, non-linear effects. small signal, noise measurements and sweeps may be performed. Component values may be swept, allowing component tolerances to be investigated as well as thermal performance etc. Comprehensive transistor modelling is incorporated using a 20 parameter Ebers Moll description. The program is supplied on disc with a very comprehensive 49 page manual.

Please write or 'phone for more information

PRICE £99.00 + VAT P&P FREE

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39 Brownlea Gardens, Seven Kings, Ilford, Essex 1G3 9NL. ☎ Tel: 01-599 1476

University Software

UNISTAT-II

MARK 2 STATISTICAL PACKAGE

***FULLY INTEGRATED SUITE OF STATISTICAL PROGRAMS * DEDICATED DATA PROCESSOR * AUTOMATED MISSING DATA HANDLING * USER DEFINED LABELS FOR VARIABLES * READING DATA FROM ASCII FILES * DIRECTION OF OUTPUT TO PRINTER OR ASCII FILES * HIGH-RESOLUTION PLOTS * COMPREHENSIVE USER MANUAL**

UNISTAT DATA PROCESSOR: A spreadsheet designed exclusively for data handling. DATA ENTRY: Cursor editing, overwrite/insert modes, continuous entry, insertion and deletion of cells, cols and rows, go to, col labels. FILE HANDLING: Read, write and merge in internal and ASCII format. COLUMN TRANSFORMATIONS: Formulas using cols as variables. Any combination of +, −, *, /, ^, LOG, EXP, SQR, ABS, SIN, etc. Operations with col numbers or labels. STATISTICAL COMMANDS: SIZE, MIS (no of missing values in a col), SUM, SSQ, MEAN (adjusted for missing values). Single or multi col sorting in asc or desc order. Ranks. CONDITIONAL FORMULAS: Selection of cases, creation of dummy and effect vars, recoding, breakdown, etc. Logical operators >, <, =, AND, OR, NOT.

MULTIVARIATE REGRESSION: Simple corr matrix, choice of dep var, selection of indep vars, noconstant reg. Selection-specific missing data handling. No. of rows and cols omitted due to missing values and multicollinearity. Output includes estimated coeffs, t-stats, std errors, R2, adjusted R2, std error of reg, F-stat, D-W stat, ANOVA of reg, var-covar and multiple corr matrices, interpolation, plot of residuals, plot of actual and fitted y values. Addition of residuals and/or fitted y values to data matrix.

STATISTICAL TESTS: Significance levels for most test stats. Test-specific missing value handling. PARAMETRIC: One sample t, two sample t with equal and unequal vars, paired t, F. NON PARAMETRIC: Chi-sqr and Kolmogorov-Smirnov, (both with equal and unequal exp freq versions), chi-sqr Bartlett, Mann-Whitney U for small, medium and large samples, Wilcoxon signed rank, Walsh, Wald-Wolfwitz runs, Kruskal-Wallis one-way ANOVA, Friedman pseudo two-way ANOVA, Jonckheere trend, Page's L, Cochran Q, Goodman-Kruskal gamma, Sommer's d. CORRELATION COEFFICIENTS: Pearson, Spearman's rho, Kendall's tau, Point biserial, Goodman-Kruskal gamma, Sommer's d, Yule's Q, phi, tetrachoric. DISTRIBUTIONS: Chi-sqr, t, F, Normal (std, non std), log, inverse and bivariate normal, binomial, negative binomial, exponential, hypergeometric, gamma function, Khrgian-Mazin.

DESCRIPTIVE STATISTICS: Analysis of raw data or data with freq counts. Raw data sorted and grouped. Freq dist with choice of lower bounds and class intervals. Absolute, cumulative and relative freq. Histograms, scatter diagrams and time series plots. Output includes sum, mean, mean deviation, median, variance, std deviation, third and fourth moments, skewness, kurtosis, range, etc.

ANALYSIS OF VARIANCE: One-way with and without repeated measures, two-way with no interaction, two-way and three-way with one, two and without repeated measures.

TABULATIONS: CROSS-TABLUATION: Two-way tables with col and row totals and percentages. CHI-SQUARE CONTINGENCY TABLE: Observed freq, exp freq and chi-sqr for each cell. Col and row sums, overall chi-square stat and its significance level. Yates correction.

HIGH RES PLOTS: All plots can be dumped on the printer. PLOT OF BIVARIATE REGRESSION: Scatter diagrams with optional line of best fit, intercept, slope, R2, std error. CURVE FITTING: Fitting of polynomials on bivariate data. Fitted polynomial coeff, R2 and std error. TIME SERIES PLOTS: Simultaneous plotting of up to 7 columns of data against time. PLOT OF FUNCTIONS: Simultaneous plotting of up to two functions, integrals, polynomials and roots of polynomials.

DEFAULT SETTINGS (For BBC version): Choice of screen and device control parameters. 40 or 80 column display, number of data drive 0/1/2/3, black & white or colour monitor width of printer, high-res screen dump command, maximum formula length, maximum number of columns and rows depending on free RAM.

LINTPRO Linear/Integer Programming Package.

Written by Dr D. Sprevak

A professional package which can solve very large problems on a 32K BBC micro by means of revised simplex algorithm and efficient vectorisation. It can solve a problem with 82 variables, 60 constraints and 15 upper bounds in 24 minutes. Runs faster on second processor, Plus or Master series. LINTPRO requires minimal prior knowledge of linear programming techniques and is ideal for real applications as well as for teaching purposes. Data entry in Backus-Naur notation. Selection of optimality of solutions between 0% and 100%. Optional printing of intermediary steps and choice of branching strategies. Output includes optimal values of variables, value of objective function, slackness, shadow prices and it can be directed to screen or to a text file.

CPA Critical Path Analysis

Written by Dr J. S. Dean

A comprehensive coverage of critical path analysis sufficient for most practical applications. Activities and durations are supplied as input and earliest and latest start and finish times for each activity, total float and critical path are obtained as output. Easy editing of inputs provides the possibility of analysing the sensitivity of solutions. A built-in calendar can give dates to any programme. Resources can be allocated to each activity. Suitable smoothing scheme is chosen and a resource bar chart is drawn. Results can be directed to printer or to text files. High-res plot of the node structure can be dumped on printer.

UNISTAT-II, LINTPRO AND CPA ARE AVAILABLE FOR: BBC B, PLUS AND MASTER SERIES, AMSTRAD PCW8256, PCW8512, IBM PC/XT/AT AND COMPATIBLES BBC versions: UNISTAT-II: £125+VAT, LINTPRO: £75+VAT, CPA: £50+VAT. AMSTRAD and IBM versions: UNISTAT-II: £150+VAT, LINTPRO: £100+VAT, CPA: £75+VAT.

Prices include post & packing within the UK. Official (government, university, local authority) orders are welcome. For orders from Europe add £5, from outside Europe £10. For BBC versions please indicate 40 or 80 track format. Cheques and correspondence to: **UNISOFT LTD, P.O. Box 383, Highgate, London N6 5UP.**

THE NETWORK PAGE

This month we examine a method of transferring programs to specified machines on the network

Robin Newman

This month's Network Page article is based around a program sent in by Scott Ling of Kirkaldy in Scotland (who gets £25 for his trouble). His Econet program enables a machine to load a program, Basic or machine code, from disc, tape or network, and then to send copies of the program directly to a selection of other machines on the network.

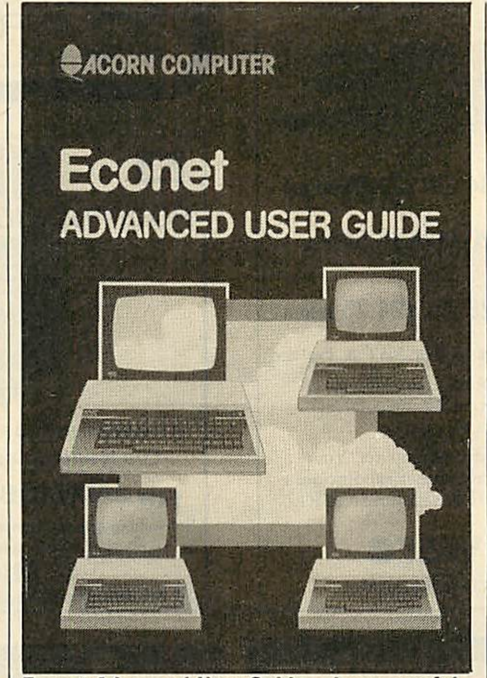
As a teacher who uses Econet daily in the classroom, I can vouch for the usefulness of such a utility to load copies of the same program efficiently and quickly into pupils' machines. As well as being a useful utility in its own right, the program will help you to understand how Econet primitive calls are used to allow direct communication between machines.

One slight limitation is that the program only works on the local network; it cannot communicate with machines on different networks connected by a bridge. For most users, however, this will not be a significant problem.

With Scott's agreement, I have altered the program slightly, adding one extra facility and listing it as single statement lines where possible to make it easier to follow and to type in. However, when you have got it working, you may find it advantageous to pack the program using one of the proprietary ROM chips around, such as the Altra *Probe*. This will have the effect of allowing slightly larger sized programs to be transmitted, although the present limit of about &5100 is adequate for most purposes. A packed version is included on this month's listings cassette and disc. Details on page 109.

Before looking at a detailed description of the program, especially the network specific parts, let us consider how the program is used. On being chained, it indicates the maximum length of file which it can transmit around the network and then invites you to enter the name of the file you wish to transmit.

Alternatively, you can if you wish type in a star command at this point, eg,*. or *DIR GAMES for example. Equally, you can change filing systems, eg, *DISC if the



Econet Advanced User Guide, always useful

program you wish to transmit is not filed on the network.

Once the file has been loaded, you are presented with four ways of selecting the station numbers to which it is to be transmitted:

1. Push to all stations
2. Push to all stations excluding some
3. Push to specified stations
4. Push to preset list of stations

I have added choice four to Scott's original program, as I have found this to be a useful addition which speeds up the use of the program. The relevant data list is in line 70 of the program, which you should amend to suit your requirements.

For choices one and four, station numbers are not specified explicitly, although you will be asked to confirm a station's inclusion in the list if it doesn't appear to be listening on the network. The data list in line 70 specifies the stations to be used for choice four. For choices two and three, station numbers can be selected in two ways, either numbers can be typed in individually separated by Return, or a number range can be typed in using a comma or minus sign as a delimiter, eg, 1,10 or 1-10 or 10,1 or 10-1 all specify the number range 1 to 10 inclusive. Several ranges can be typed in one after the other, separated by Return. For example, to select stations one to 10, 15 to 20 and 25, enter the following:–

1–10 Return
15–20 Return
25 Return

A null entry Return terminates the list.

When the list is completed, you are given the opportunity to confirm the choices. Two final options remain before the file is transmitted to the selected stations. You are asked if you wish to specify the page location for the destination machines, or the location address for the case of a machine code file. Note page settings must be exact multiples of &100 eg, &1900, &2200. The final option allows you to specify whether you wish the files to be executed or run in the destination machines, or merely to be loaded.

Once these responses are complete, the file will be 'pushed' in turn to each of the stations in the selected list. Messages are printed on the screen signifying success or failure for each machine in turn. After all the transmissions are completed, pressing any key restarts the program. To exit the program you should press Break.

Program description

First, a broad outline of the program. Lines 120 to 210 set up some initial variables, including various buffers to store the list of stations to be transmitted the program (bB%), to store the name of the file to be loaded (namebuf%) and to act as parameter blocks for the operating system calls OSFILE (osf%), OSCLI (cli%), and for all the network calls (pb%).

Lines 220 to 260 *PROT the machine, and determine its local station number (more detail later).

Line 270 determines the amount of room left for the main program buffer, which is dimensioned in line 290.

PROCs (line 280 and 1130) prints out the title heading, and the length of the file buffer.

The error handler is set up in line 300. One interesting feature is that the restart point is adjusted by the variable L%, depending upon where an error (eg, accidently pressing the Escape key) occurs in the program listing.

The next section of the program (lines 310 to 410) gets the filename, checks whether it exists (PROCchk, line 380 and 2000) and if so, whether it is within the permitted length. If all is satisfactory the file is loaded in line 420. Line 370 permits star commands to be issued when prompted for the filename, so that catalogue commands or *DIR commands can be issued here. These are executed by PROCC (line 370 and 2350), which also uses PROC1 (line 2380 and 1700).

As we move on to the next section, L% changes to two, so that if an error occurs the program now restarts at line 450.

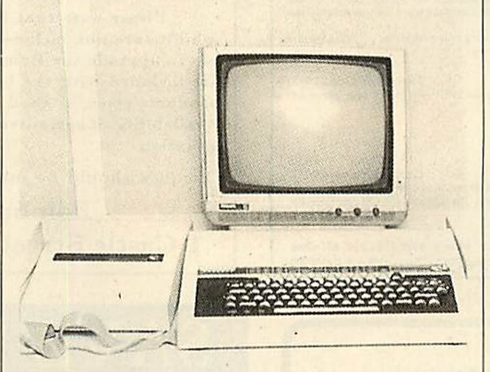
Lines 440 to 490 allow the user to choose an appropriate way of specifying the stations to which the file is to be sent. PROCt1 (lines 450, 490 and 1210) prints the menu of choices, and allows the chosen item to be highlighted.

From lines 500 to 710 the buffer VB% is set up to contain the list of stations to which the file is to be sent. Each byte of this buffer represents a station number. If it is set to one, then the file will be sent to that station. If it is zero then it will not. The logical flow of the program is quite complex in this section. Initially all the station byte values are set to one for menu choices, one and two or to zero for choices three and four. For menu choice one, that is the end of the selection process (set out in line 560).

For all the other choices extra stations have either to be added to or excluded from the initial list. The parsing of the input line for range inputs is performed by PROCmu (lines 630 and 1260). For choices three and four PROCnt (lines 660, 1360 and 1940) checks whether the stations selected are listening on the network ie, if they are switched on, plugged into the network and have no protection mask set with *PROT. PROClarge indicates invalid station numbers (lines 650, 1310 and 1900). Line 710 makes sure that the local station number is not included in the specified list of stations.

The next section (lines 720 to 840) prints out the list of stations selected. The program will try to display the smallest amount of station numbers possible. For example, if the program is to be pushed to stations one to 200 inclusive then it would print 'all stations' followed by 'excluding' and the remaining 54 station numbers. PROCfg (lines 740 and 1430) makes this selection, setting 0% to zero for all stations, 0% to one if more stations are included in the list than excluded, and 0% to two if fewer stations are selected than excluded.

Assuming that the list is acceptable (lines 850 and 860), the next section presents the final two options (lines 870 to 970). First, lines 890 and 900 determine whether the file is a Basic program or not. This is assumed to be the case if the first byte of the program is 13 and if the high byte of the execution address is &80 (as with Basic I or II) or &B8 (in Hibasic) Obviously, this is not foolproof, but it should be sufficient in most cases. The variable Q% is set to one for a Basic program and



Programs can be transferred to any machine

zero otherwise. C% is used to signify whether the load address of the file is to be specified. Initially it is set to zero in line 910. In the following line D% is set to the original execution address of the program, as read previously by PROCchk. Both of these values are amended if required in PROCpage (lines 950 and 2520). C% is adjusted to the destination address required, which is checked to be a page boundary by PROCchek (lines 2570 and 2620) in the case of a Basic program. If a machine code program is relocated, (it is assumed that the code is relocatable in this case!) then D% is adjusted to relocated execution address. The final choice, whether the file is to be executed once it has been transmitted, is contained in variable U% which is set true if the file is to be executed (Line 970).

Network section

At long last, we reach the main network specific part of the program (lines 980 to 1080). The REPEAT . . UNTIL loop (lines 1000 to 1080) steps through the station numbers (V%) one by one, and rejects those which are not in the selected list (line 1020). For the remainder, PROCnt (line 1030 and 1940) checks whether they are listening, by using PROCpp (LINE 1940 AND 1560) to peek the location which holds the current value of PAGE (&18), storing the result in P%. P% remains zero if there is no reply from the station interrogated, and if so an error message is output (line 1950), and an error flag (R%) is set to one All being well, a message is output by PROCprint (line 1050 and 1970) and then the destination machine has a 'fatal error' sent to it by PROCstop (line 1060 and 2790) which stops any program already running in the machine. This is the second small addition I have made to Scott's original program. Note this only works properly for a machine fitted with Basic II or later. Basic I machines will ignore this command, and so if your machines have this Basic fitted you will have to make sure they are not running a program prior to using pushed.

Receiving data

The destination machine is now ready to receive the file being pushed and PROCba or PROCmc is selected to do the pushing, depending upon whether the file is a basic program or not (lines 1070, 2660 and 2740). In each case the file is poked across to the destination machine using PROCpk (lines 2680, 2760 and 1610), the variable C% in the parameter list specifying the memory location to poke to in the destination machine.

In PROCba the value of PAGE is set by sending the command PA.=&xxxx to the remote machines input buffer using PROCtrm (lines 2700 and 1760). This is followed by sending OLD which resets Basic's pointers, and then by sending RUN if that option is selected (line 2720). The procedure is similar but simpler for PROCmc. In this case, having poked the file across, the command CALL&xxxx is inserted into the remote machine's input buffer if the execute option has been selected (line 2770).

Once all the stations in the selected list have been dealt with, the program awaits a key press (lines 110 and 2320) and then resets the main heading (line 1110) before restarting (line 1120).

Network specific calls

Having whetted your appetite with a description of the whole program, we can now move on to the nitty-gritty of the network specific calls used. The fundamental procedures to understand are

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PROCpk, PROCstop, PROCtrm and PROCcall, together with lines 220 to 260. PROCnt, PROCpp, PROCba and PROCmc also communicate with the remote station, but they merely make use of these first four procedures. One other important procedure to understand is PROCchk, which obtains the program file's catalogue entry information.

Parameter blocks

All of these fundamental procedures use a parameter block to pass and receive information, as discussed in the December 1986 *Acorn User* Network Page. The main network parameter block used has an address pb%. In each case, when the block has been set up with the appropriate information PROCcall is used to initiate the relevant OSWORD call. The parameter in the brackets, eg, PROCcall (19), is the value A% takes. X% and Y% are set to point to the parameter block, X% taking the 'low' half of the 16-bit address and Y% the 'high' half (lines 1850 to 1890). Lines 220 and 230 use OSWORD &13 (or 19) to *PROT the local machine.

The parameter block has two values in it. The first byte is five, the code for the PROT command, and the second is &FF the protection mask to be written. This is detailed on page 61 of Acorn's Econet Advanced User Guide.

The mechanism used to set this up is perhaps confusing (line 220). The '!' operator pokes four successive bytes of memory at one go. The confusion arises because it reverses the order of the byte values supplied to it. In this case &(00 00 FF 05) ends up in the following locations: 05 in address pb%, &FF in address (PB%+1), and 00 in each of (pb%+2) and (pb%+3).

Lines 240 and 250 use the same call, but with the parameter block set up to read the local machine's station number. The single value 8 is inserted at pb%, and the result is returned in location (pb%+1), from whence it is read into the variable sn% (line 260). See the Econet Advanced User Guide, page 62.

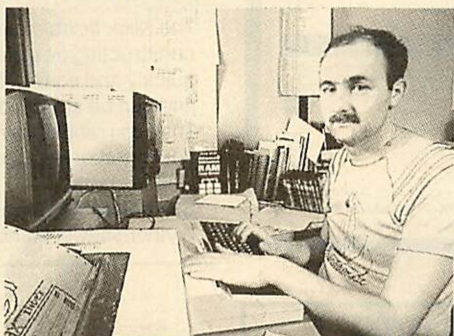
PROCpk is used both to poke and peek data to and from the remote machine. The two calls are almost identical, differing only by the control code located in the first byte of the parameter block. The block looks like the following table.

Address	Value
pb%	&81 for peek, &82 for poke
pb%+1	&00
pb%+2	Remote station number
pb%+3	Station high byte or Net number (usually 0)
pb%+4	Start address of data buffer in local machine
-	
pb%+8	End address of data buffer in local machine
-	
pb%+12	Address of data start in remote machine
-	
pb%+16	

These values are set up in lines 1610 to 1670. Again the '!' operator is used for efficiency. With the values ready, PROCcall (16) is used to initiate the operation. See the Econet Advanced User Guide, pages 52 and 53.

PROCstop (lines 2790 to 2830) uses OSWORD with A%=&14 or 20. The parameter block is as follows:

Address	Value
pb%	2
pb%+1	Station number to be sent error
pb%+2	Station number high byte (net number) usually 0


Bruce Smith with the Redwood network

PROCtrm (lines 1760 to 1810) also uses OSWORD &14 or 20 to insert text in a remote machine's input buffer. This call was discussed in the December 1986 issue. The parameter block looks like the following:

Address	Value
pb%	01
pb%+1	Destination station number
pb%+2	Station high byte or Net number (usually 0)
pb%+3 onwards	Message string terminated by character 13

Note the technique used in lines 1770 and 1780. It is often convenient to use the '!' operator to write four bytes where you only require two, and then to overwrite the unwanted ones. Line 1770 writes to (pb%+1) to (pb%+4). Line 1780 then writes again to (pb%+3) onwards.

Finally, let's look at PROCchk. Although not a network specific call, this uses the same parameter block approach (lines 2000 to 2070). The procedure uses the call OSFILE (&FFDD) and the block is at address osf%. A% has the value five which is the code to read a files catalogue information. X% and Y% point to the block (lines 2040 and 2050). The value of the 6502 microprocessor A register after the call, contains information on the file type; zero if not found, one if a file and two if a directory. This is read into A% using the USR function. This performs similarly to the basic CALL command, except that it returns a four byte number consisting of the values of the various 6502 registers on exit from the call. It is made up of the eight hex digit number &PPYYXXAA, where P is the 6502 flags register, and X,Y and A are the three working registers of the same name. A's value is extracted by ANDind the number with &FF. The parameter block is shown in the figure below:

Address	Value	
osf%	address of filename (namebuf) ——→	namebuf% contains
-		
osf%+2	load address for file	filename terminated by
-		
osf%+6	execution address for file	character 13
-		See line 2010
osf%+10	length of file	
osf%+14	file attributes	
-		
osf%+18		

See the Econet Advanced User Guide, page 38 for further details. Note only the first entry at osf%, together with the filename in namebuf%, are entered before the call. The remaining values are returned as data after the call is made. Information is read from this data in lines 410 2680 and 2760 (file length), 900 and 920 (execution address), 2590 (execution address and load address) and 2750 (load address).

That's all for this month. Thanks to Scott for supplying the program upon which out thoughts have been centred. Please keep your ideas and comments coming, so that the Network Page can be used in the way you want it to be.

All being well, the next offering will be in the April issue.

The program is also on this month's listings cassette and disc. For details turn to page 129 for order form.

Turn to page 113 on the yellow pages for details of the network program and how to enter it.

ULTIMATE UTILITIES

All to often a printer is not used to its full capacity, here we examine utilities to help you get the most out of it

Chris Drage and Nick Evans

Letters from readers show that printers often cause the biggest headaches and disappointments. Manuals don't provide much help, so the £250 printer can become the most underused item of hardware. A modern dot-matrix printer is packed with facilities. To help you make the most of this hefty investment, two packages have been reviewed which have proved to be robust, affordable and worthwhile.

Dumpmaster from Beebugsoft is a package which helps you to get a great deal more out of your printer. The disc version supports 10 makes of printer and the ROM version, 26. *Dumpmaster* is almost certain to work for you and it works with all models of BBC micro.

The fact it is both ROM and disc based is an advantage, especially in schools where the printer may be moved between computers. However, the disc version is not as powerful and will only create machine code dumps which must be saved before being used.

The *Dumpmaster II* ROM offers quick, accurate dumps from any model, text or graphics. It also includes a 'snapshot' facility which is very useful for schools. Providing a program is not protected, a screen can be frozen and dumped immediately or saved to disc for future printing.

Perhaps the most versatile utility is *BPRINT, the graphics dump. It is very easy to implement and provides a well proportioned dump in pleasing grey tones, even for mode 7. All those screens children have created using viewdata packages, lightpens, Concept Keyboards and the like, are now easily and accurately reproduced in hard copy with standard or linear dumps. The latter overcomes the printer's distortion of the screen. A simple four line program is all that is necessary to load and dump a screen:

```
10 MODE n
20 *LOAD screen
30 *BPRINT (plus up to 11 additional parameters if required)
40 END
```

Both negative and positive images can be produced and a windowed portion of a screen may also be specified. After children have dumped a screen, encourage them to colour it in.

Dumpmaster II has a lot to offer and an imaginative teacher or parent will find many possibilities for using the printer.

Font utilities

Modern dot-matrix printers can provide near letter quality (NLQ) print which is far superior to the standard dotty print. However, now you can actually go beyond the NLQ and produce some very impressive fonts indeed. Communication becomes more effective because of the improved presentation of information, giving the printed word a style that normal characters and printing cannot achieve. The sample story (partly reproduced here), illustrates how a *Wordwise* file has been completely transformed in appearance.

One package which provides a suite of tools with which to construct and use fancy fonts is *Fontwise+* and *Fontwise Editor* from Clares Micro Supplies. Both *View* and *Wordwise* files can be used with either package. Being disc-based means the package is portable between computers.

Fontwise+ has the advantage that it will work on Epson RX, LX and FX printers plus all their compatibles. There are 10 fonts available which are used via one of the following wordprocessors; *View*, *Wordwise*, *Wordwise+* and *Mini Office II*. However, in practice any text saved as an ASCII file can be printed via *Fontwise*. The maximum text size of 9k is an inconvenience. However, using a *Fontwise+* embedded command, sub-files of a document can be printed consecutively with all formatting and pagination intact.

Each font is available in normal size, condensed and proportionally spaced as well as magnified.

Many teachers have experienced frustration while transferring files from standard disc filing system (DFS) format to advanced disc filing system (ADFS). *ViewStore* and *ViewSpell* utilities seem to have caused the most headaches.

If your school has a Master 128 you would already possess Acorn's *Copyfiles* program. This utility results in a rather lengthy and slow transfer process between filing systems. However, for guidance, here is a brief summary of the process:

1. Format a small, medium or large ADFS disc (according to the capacity of your drive). BBC B owners must first create an 80 track DFS copy of their *ViewStore* utilities using the *Config* program supplied.
2. *DISC
3. *DRIVE 0 40 (Reads the 40 track utilities disc without *Config* program)
4. *BASIC
5. *FADFS
6. *MOUNT 0 (insert ADFS utilities disc in drive 0)

```
**********************************
HASTINGS.

                    17 Oct 86.
**********************************
the  small  castle  window  and I
 down.  Then the  portcullis  was
he guard and the messenger walked
er evidently wanted me because he
n  the stout wooden door.  I said
e time.  Sir Richard  de  Austin,
 that he wants you at his castle.
arold of England has been crowned
gather as many  men  as  possible
d.  It will be easy  to get ready
s dismissed by him and sent away.
y Harold will go up there to send
land.

.=-=-=-=-=-=-=-= 

HASTINGS.

                    17 Oct 86
.=-=-=-=-=-=-=-=
 window and I suddenly saw the
ie portcullis was pulled up. The
 messenger walked to the keep and
 because he clattered up the stairs
. I said "come in." The messenger
in, William sends me here to tell you
? Because he has just heard that
ng of England, and he wants you to
in him on a attack on England. It
 a viking friend of Harolds was
ill attack up North and hopefully
while will land safely in England.
```

Formatting a story with *Worldwise*

7. LOAD "COPYFILES"
8. *MOUNT 0 (insert ADFS Viewstore work disc into drive 0)
9. *CDIR VIEWSTORE
10. *DIR VIEWSTORE
11. *CDIR D
12. *CDIR E
13. *CDIR F
14. *CDIR I
15. *CDIR S
17. *CDIR U
18. RUN

The *Copyfiles* program will now ask various questions that you should answer, pressing Return where needed and swapping discs as you go:

1. Source filing system? : D
2. Enter DFS drive number : 0
3. Enter source directory : D
4. Insert DFS disc into drive 0
5. Destination filing system? : A
6. Enter ADFS drive number : 0
7. Enter destination directory : $.VIEWSTORE.D
8. Copying mode? L
9. Source list specification? *

Copyfiles will copy all the files in disc filing system directory D to directory $.VIEWSTORE.D on your ADFS disc. Repeat the procedure for directories E, I, R, S, and U.

The whole process is lengthy and time consuming. Better software does exist, for example *Mastercopy* from MB Software. Where it scores over its rivals is in its simplicity and speed, even on a single disc drive. Auto boot the disc, answer two or three questions and a DFS disc is transferred very quickly indeed. Using the example above, *Mastercopy* transferred all the *ViewStore* utilities from the 40-track, DFS disc to an ADFS formatted disc in three minutes using dual drives! It created all the necessary ADFS directories automatically.

Mastercopy is in fact a ROM image which is loaded into a sideways RAM bank on the Master. Once installed, it uses an 84k of RAM buffer to enable it to transfer as many files as possible in one pass. This is why the process only takes a fraction of the time taken by the Acorn utility. It will not work if you have altered any of the 32k ROM links in the computer. Nor will it copy 'protected' discs.

The system also allows ADFS files to be copied to DFS formatted discs. Take care here because longer ADFS filenames will be truncated to seven characters, so that UTILITY1, UTILITY2 each are saved as UTILITY, the latter overwriting the first. If you have a Master 128 there is no doubt that for speed and simplicity of file transfer *Mastercopy* is unrivalled.

EXTRA! EXTRA!

PAGEMAKER CLIP-ART FONTS, & UTILITIES

This is the new HITEC-S font

This is the new CUTE font

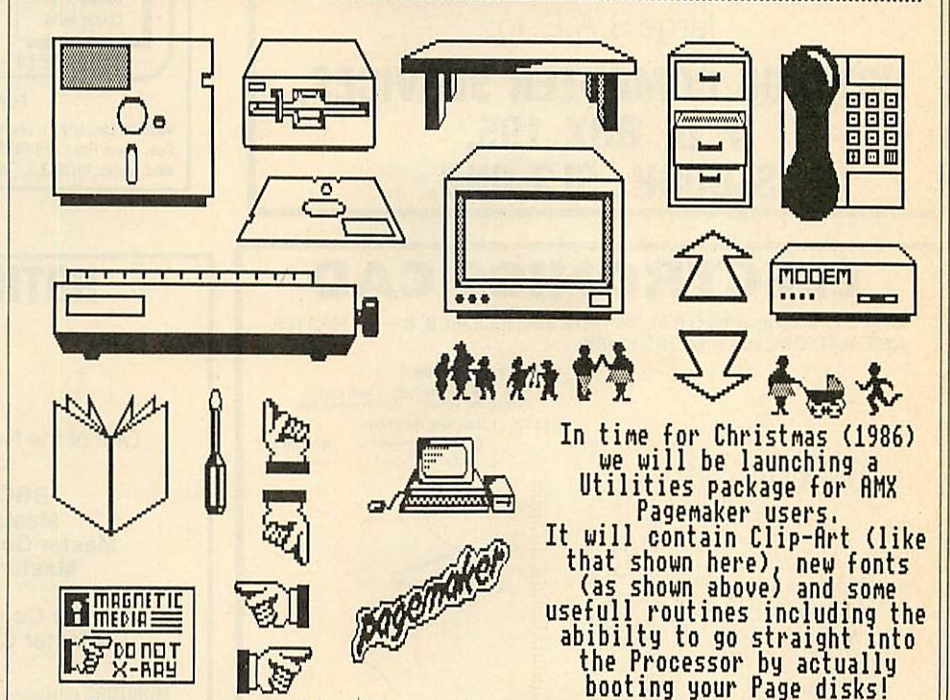
This is the new FUTURIS font

This is the new MILITRY font

this is the new ADVENT font

This is the new STREET font

This is the new Bradley font



Other routines will allow you to load AMX Super Art fonts into Pagemaker and Vica-Versa and Copy Pages from disk to disk.

More details nearer the time...

***Pagemaker's* new fonts and utilities**

An interesting utility with a broad appeal has been brought out by Advanced Memory Systems, the creators of the AMX Mouse and all its associated works. *MAX* attempts to emulate the desktop that comes with the Apple Macintosh or the Gem desktop available with the Master 512.

Like all mouse-driven packages it is essentially simple, consisting of moving the pointer to activate windows. Once activated the contents of a window may then be operated upon in a number of ways. As an example, it is possible to catalogue your disc, highlight a filename and, by pressing the Execute button on the mouse, to run the filename in an appropriate fashion.

The good thing about *MAX* is it allows you to examine files on a variety of drives, compare them, copy them, discover information about them and hold all that

information on screen at one time. The necessity to constantly type INFO and *CAT is removed since the catalogues, once read, are stored in memory.

It is also possible to change some of the basic configuration of your machine with *MAX*. Background and foreground colours can be altered and a different mode selected before you start wordprocessing. This is done very quickly using *MAX*. This item was written with green text on a black background and the keyboard repeat set higher than normal in order to dash the cursor around more swiftly.

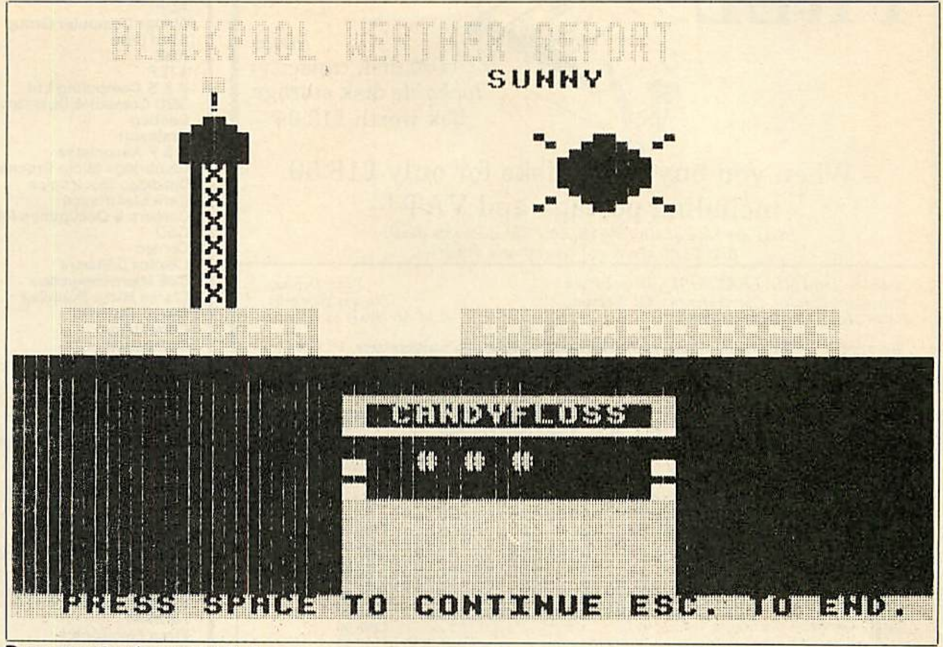
This type of instant set-up facility is quite useful although many people would do it from a !BOOT file. The ROM chips in the machine may also be examined and activated although, strangely, there is no facility for turning them off.

Pull-down menus allow the user to catalogue the disc surfaces either by title or by style of file. These may then be run, copies, examined, deleted, renamed or locked by simple 'icon-clicking'.

Staying with AMS for a while longer, *Extra! Extra!* by Alex Block of Tecnation is now available for use with *Pagemaker*. The problem with *Pagemaker* is that the format of the page disc allows you little freedom to edit the files or compile discs of files relating to particular topics. The page copying utility now allows you to do this and, what's more, the customising utility lets you dispense with the main system disc for everything except pre-viewing, defining and mode-converting. For those readers not conversant with *Pagemaker*, this means that a two-chip, multi-disc system has been greatly simplified.

The package comes complete with a suite of 20 new text fonts which cover every style from 'computer print' as on cheque books, to a military-style template font which can look as if it's been sprayed on! There is also a vast range of compacted 'clip-art', the small drawings, symbols and cartoons that make the editor's life a lot easier. If you are working on 40-track discs you will need four discs to hold the uncompacted screens. One further bonus is that AMS come up front about a couple of small bugs in their program which, as they point out, only occur if you try to do something pointless or stupid.

And so to the competition. Mirrorsoft has likewise brought out a series of utilities to enhance its package. After long negotiations with Walt Disney it has finally succeeded in publishing its Disney characters graphics disc. This works in the same fashion as all clip-art and may be drawn piece-meal into the main editor. This disc supplements the *Fonts 'n' Graphics* disc which provides a further 10 fonts and 100k of pictures and useful clippings.



***Dumpmaster* 'snapshot' dump**

On ice

One of my personal favourites in the utilities world is *Ice-box* from Event One Limited. This package is a sideways RAM utility and, as such, can only be used with machines that have a board fitted. In schools, it is often the case that programs are not customised to suit the needs of the user. The 'if only I could do so and so . . .' syndrome often plagues both pupil and teacher. A good example of this is that fine old stand-by *Facemaker* from ASK/ESM. How many readers have used this package with reasonably computer-aware children who have said at the end, 'can we print out the picture? The lack of a printer utility has meant that half an hour's work has gone for nothing. With the same program the problem crops up when the bell goes for next lesson and you wish to save the state to which you've developed the picture it can't be done. At least, not until the advent of utilities like *Ice-box*.

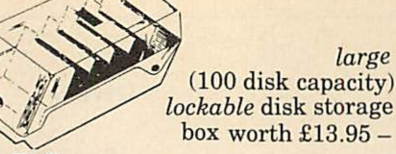
To be fair, you will need a certain amount of basic expertise with the computer before you can exploit this package. The principal of the program is very simple: It sits in your sideways RAM bank, waiting for you to press Control. The moment you do so, it freezes everything, both on the screen and internally. Stored in the RAM you will have defined the function keys to perform particular tasks. As soon as the machine freezes these keys are activated. You may, for example, have chosen 'f0' to *SAVE the current screen to screen to disc. Alternatively, it may dump a copy of the screen to printer, using the *Dumpmaster* program mentioned earlier. You may if you wish 'save the current activity' which translated means 'save all the current memory to disc'. This may then be restored at a later date, without the program disc being present.

Another more useful idea with added value for the classroom, especially for children with special needs, is the 'Speed' function. This allows the user to reduce the speed at which a program runs so a child is able to tackle a game or problem at their own speed. Of course, it's also useful for cheating at games!

AMS, 166-170 Wilderspool Causeway, Warrington WA4 6QA. Tel: (0925) 413501. MAX: £19.95 (disc), Extra! Extra!: price not yet available. Mirrorsoft, Maxwell House, 74 Worship Street, London EC2 2EN. Tel: 01-377 4745/4645. Fonts 'n' Graphics: £14.95 (disc), Disney Characters: £14.95 (disc). Event One Ltd, 73 Church Street, Malvern, Worcs. Clares Micro Supplies, 98 Middlewich Road, Northwich, Cheshire CW9 7DA. Tel: (0606) 48511. Beebugsoft, PO Box 109, High Wycombe, Bucks HP10 8NP. Tel: (0727) 40403. Dumpmaster II (ROM): Beebug members £23.25, non-members £31; Dumpmaster (disc) Beebug members: £11.25, non-members: £15.00. MB Software, 4 Arden Close, Hadrian Park, Wallsend, Tyne and Wear NW28 9YB. Mastercopy £12.95 (disc), £14.95 (ROM).

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